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THE UNIVERSITY OF ALBERTA  
THE SASKATCHEWAN EDUCATION PRICE INDEXES, 1957-1965

by



HARRY ERNEST MILLER

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The undersigned certify that they have read,  
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acceptance, a thesis entitled "The Saskatchewan  
Education Price Indexes, 1957-1965" submitted by Harry  
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for the degree of Master of Education.





## ABSTRACT

The purpose of this study was to measure the impact of inflation on educational inputs classified as current operating expenditures for school authorities in Saskatchewan during the period 1957-1965. This necessitated the compilation of three sets of price indexes to measure movements in the price level of educational inputs for the province as a whole, for School Units, and for small area authorities.

The price indexes suggested that the increase in price level of educational inputs increased 52.53 per cent over the nine-year period. The average annual rate of price level increase was 5.84 per cent.

Analysis of the price indexes suggested that the price level of inputs other than teaching services increased 21.16 per cent over the nine-year period while that of teachers' salaries increased 68.47 per cent. When allowances were made for changes in the level of teacher qualification, the price level increase was reduced to 44.21 per cent.

A comparison of the Saskatchewan Education Price Indexes with other commonly-used indicators of price level in the economy pointed up the need for special price indexes for education.





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## TABLE OF CONTENTS

CHAPTER		PAGE
I.	THE PROBLEM . . . . .	1
	Introduction . . . . .	1
	Statement of the Problem . . . . .	3
	Statement of the Sub-Problem . . . . .	3
	Statement of Need for the Study . . . . .	6
II.	RELATED LITERATURE. . . . .	9
	Introduction . . . . .	9
	Development of Price Indexes . . . . .	9
	Problems of Price Index Construction. . . . .	10
	Problems of Quality Change . . . . .	10
	Problems of Base Year Choice . . . . .	14
	Problem of Formula Choice . . . . .	16
	Problem of Commodity Choice . . . . .	18
	Problem of Weight Choice . . . . .	19
	Problem of Price Data Selection . . . . .	20
	Summary . . . . .	21
	Price Indexes in Education . . . . .	21
	United States Indexes . . . . .	22
	Vaizey's Index . . . . .	27
	The Alberta Price Index . . . . .	30
	Summary and Conclusions . . . . .	35
III.	RESEARCH PROCEDURES . . . . .	38
	Introduction . . . . .	38



	vi
CHAPTER	PAGE
Formula Choice . . . . .	38
An Overview . . . . .	43
Definitions . . . . .	44
Delimitations . . . . .	46
Limitations . . . . .	47
Assumptions . . . . .	47
Data Collection . . . . .	48
Expenditure Data . . . . .	48
Price Data . . . . .	49
IV. THE SASKATCHEWAN EDUCATION PRICE INDEXES	52
Introduction . . . . .	52
An Overview . . . . .	52
Method of Construction . . . . .	55
Major Subindexes . . . . .	55
Component Subindexes . . . . .	57
Steps in Major Subindex Construction	57
Training and Quality in the Teaching	
Force . . . . .	58
Stages in the compilation . . . . .	61
Weighting Patterns for Major	
Subindexes . . . . .	64
Stages 1 and 2: Major Subindex	
Construction . . . . .	71
Salary Subindexes . . . . .	71





CHAPTER	PAGE
Administration Subindex . . . . .	88
Instructional Supplies Subindex . . . . .	97
Plant Operation and Maintenance Subindex. . . . .	101
Conveyance Subindex . . . . .	111
Fees and Auxiliary Services Subindex	118
Stages 3 and 4. Final Index Con- struction . . . . .	120
Stage 3 . . . . .	120
Stage 4 . . . . .	125
V. DISCUSSION OF THE SASKATCHEWAN EDUCATION	
PRICE INDEXES . . . . .	132
Introduction. . . . .	132
Differential Effects on School Units and Small Area Authorities. . . . .	132
The Instructional Salary Subindexes . . . . .	135
Effect of Quality Assumptions on the Instructional Salary Subindex . . . . .	135
Quality Assumptions and the Overall Indexes . . . . .	138
A Comparison of the Saskatchewan and Alberta Education Price Indexes . . . . .	139
The Other Inputs Subindexes . . . . .	143
The Salary Subindexes . . . . .	145
The Education Price Indexes . . . . .	147



CHAPTER	PAGE
The Saskatchewan Education Price Indexes and Other Indicators of Price Level . . . . .	147
Real Expenditures for Education . . . . .	150
Weighted Pupil Data . . . . .	152
Real Expenditures per Weighted Pupil. . . . .	155
Summary and Conclusions . . . . .	157
VI. SUMMARY, CONCLUSIONS, AND IMPLICATIONS . . . . .	160
Summary of the Problem. . . . .	160
Summary of Assumptions . . . . .	161
Major Assumptions . . . . .	161
Minor Assumptions . . . . .	161
Summary of Research Procedures . . . . .	165
Instructional Salary Subindexes . . . . .	166
The Findings . . . . .	167
Recommendations for Further Research. . . . .	168
BIBLIOGRAPHY . . . . .	170
APPENDIX A: Sample of School Authorities Used for Component Subindex Weighting. . . . .	172
APPENDIX B: Data for Administration Subindex . . . . .	176
APPENDIX C: Data for Instructional Supplies and Equipment Subindex . . . . .	180
APPENDIX D: Data for Plant Operation and Maintenance Subindex. . . . .	186
APPENDIX E: Data for Conveyance Subindex . . . . .	194





# LIST OF TABLES

TABLE		PAGE
I.	Expenditure Categories and Weightings for the National Education Association Index, 1914-30 . . . . .	22
II.	Subindexes, Published Series and Weights Used for the New York State Education Department Index . . . . .	25
III.	Subindexes, Weights and Published Series Used in Nevada State Department Index.	27
IV.	Subindexes and Weights for the Various Areas in the Alberta Education Price Indexes . . . . .	30
V.	Alberta Education Price Indexes . . . . .	35
VI.	Operating Expenditures of Saskatchewan Provincial School Authorities, 1957-65	39
VII.	Operating Expenditures of Saskatchewan School Units 1957-1965 . . . . .	40
VIII.	Operating Expenditures of Saskatchewan Small Area School Authorities, 1957-65	41
IX.	Relationship Between Type of Saskatchewan Teaching Certificate and Years of University Training . . . . .	60



## TABLE

## PAGE

X.	Weighting Data for the Instructional Salary Subindexes and the Instruc- tional Supplies and Equipment Subindex at the Provincial, School Unit and Small Area Levels of Aggregation. . .	66
XI.	Major Subindex Weights for Provincial, School Unit, and Small Area Education Price Indexes . . . . .	72
XII.	Computed Total Salary, Total and Percentages of Total Salary Paid by Certification in Saskatchewan 1957-65.	74
XIII.	Weights Assigned to Components of Instructional Salary Subindexes II and III . . . . .	75
XIV.	Annual Salaries and Price Relatives for Saskatchewan Teachers by Certification Level 1957-1965 . . . . .	78
XV.	Annual Salaries and Price Relatives for Saskatchewan Teachers by Certification Level, 1962-1965 . . . . .	79
XVI.	Instructional Salary Subindex I . . . .	80
XVII.	Details of Construction of Instructional Salary Subindex II . . .	82
XVIII.	Details of Construction of Spliced Instructional Salary Subindex II . . .	83



TABLE	PAGE
XIX. Details of Construction of Instructional Salary Subindex III. . .	85
XX. Details of Construction of Spliced Instructional Salary Subindex III. . .	86
XXI. The Instructional Salary Subindexes . .	87
XXII. 1957 Expenditures on Administration by School Units and Small Area Authorities . . . . .	90
XXIII. Details of Construction of the Administration Subindex . . . . .	96
XXIV. Weighting Data for the Components of the Instructional Supplies and Equipment Subindex . . . . .	98
XXV. Details of Construction of the Instruc- tional Supplies and Equipment Subindex.	102
XXVI. Details of Weight Determination for Components of the Plant Operation and Maintenance Subindex . . . . .	104
XXVII. Details of Weight Determination for Utilities Component of the Plant Operation and Maintenance Subindex . .	106
XXVIII. Details of Construction of the Plant Operation and Maintenance Subindex . .	110





TABLE	PAGE
XXIX. Details of Component Weight Determination for Conveyance Subindex . .	114
XXX. Details of Construction of Conveyance Subindex . . . . .	117
XXXI. Determination of Price Relatives for Fees and Auxiliary Services Subindex	119
XXXII. Details of Construction of Provincial Other Inputs Subindex . . . . .	122
XXXIII. Details of Construction of School Unit Other Inputs Subindex . . . . .	123
XXXIV. Details of Construction of Small Area Other Inputs Subindex . . . . .	124
XXXV. Details of Construction of Provincial Education Price Indexes .	128
XXXVI. Details of Construction of School Unit Education Price Indexes . . . .	129
XXXVII. Details of Construction of Small Area Education Price Indexes . . . .	130
XXXVIII. Average Annual Rate of Price Level Increase for Provincial, School Unit and Small Area Authorities . .	134
XXXIX. Effects of Quality Assumptions on Instructional Salary Subindex Values	137



TABLE	PAGE
XL. Effects of Quality Assumptions on Provincial Education Price Index Values . . . . .	140
XLI. Effects of Quality Assumptions on School Unit Education Price Index Values . . . . .	141
XLII. Effects of Quality Assumptions on Small Area Education Price Index Values . . . . .	142
XLIII. A Comparison of the Other Inputs Sub- indexes of the Saskatchewan and Alberta Education Price Indexes . .	144
XLIV. A Comparison of the Salary Subindexes of the Saskatchewan and Alberta Education Price Indexes I . . . . .	146
XLV. A Comparison of the Saskatchewan and Alberta Education Price Indexes I. .	148
XLVI. The Saskatchewan Education Price Indexes and Commonly-Used Indicators of Price Level . . . . .	149
XLVII. Details of Computation of Expenditures per Weighted Pupil . . . . .	154
XLVIII. Expenditures per Weighted Pupil in Constant Dollars . . . . .	156





## TABLE

## PAGE

XLIX.	Salary Data for the Labour Components of the Administration Subindex . . . .	178
L.	Price Data for Various Components of the Administration Subindex . . . .	179
LI.	Price Relative Determination for the Book Component of the Instructional Supplies and Equipment Subindex . . .	181
LII.	Details of Price Relative Determination for School Supplies Component of Instructional Supplies Subindex . . .	182
LIII.	Details of Price Relative Determination for Various Components of Plant Operation and Maintenance Subindex . .	187
LIV.	Details of Construction of a Price Relative for Utilities Component of Plant Operation and Maintenance Subindex	188
LV.	Details of Construction of Repairs Component of the Plant Operation and Maintenance Subindex . . . . .	189
LVI.	Details of Construction of the Repairs Component Subindex for Conveyance . .	195
LVII.	Details of Price Relative Determination for the Mechanics' Salaries Component of the Conveyance Subindex . . . . .	196



## CHAPTER I

### THE PROBLEM

#### I. INTRODUCTION

Inflation, which has been the common experience since the end of the war, may be thought of simply as a situation of rising prices. Some economists prefer to abandon the term "inflation" and instead discuss the behavior and determinants of the general price level which represents an average of many prices (3,Ch.1). Since all prices are not equally important, it is usually felt necessary to represent the general price level as a weighted average so that the movement of an individual price contributes to the movement of the whole in proportion to the importance with which it is regarded.

The behavior of the general price levels of various sections of the economy may differ and hence it could be said that inflation may have more severe effects on some sections than others. Benson cites four effects of inflation upon public education (2,pp.508-11).

First, due to infrequent property assessments, the yield of property taxes falls behind the rise in price levels unless the tax rate is advanced sufficiently



year by year. Since tax increases are highly visible and may be resisted by taxpayers, it is sometimes difficult to maintain the real value of school expenditures when the property tax does not respond to increases in price levels.

Secondly, Benson states that inflation erodes the real value of grants for education. Where grants are of the fixed type, they do not respond to increases in price levels and hence the purchasing power of school authorities decreases.

Thirdly, the fear of continued inflation discourages financial participation by the federal government. This is due to the fact that a federal school program could possibly result in deficit budgeting rather than in an unpopular increase in taxes. Deficit budgeting is held to be inflationary.

Lastly, inflation affects borrowing. Investors are reluctant to place funds in fixed-yield securities, such as school bond issues, in times of inflation and hence demand greater interest rates as compensation for the risk of loss of value.

In summary, inflation in the economy as a whole has the effect of creating problems in raising school funds. The magnitude of these problems depends to a large extent on the movement in price levels of



educational inputs.

It is the purpose of this present study to determine the behavior of the general price level of certain educational inputs in the Province of Saskatchewan during the period 1957-1965 inclusive.

## II. STATEMENT OF THE PROBLEM

The problem is to compile a set of price indexes which will measure the effect of inflation on certain specified educational inputs of school authorities in Saskatchewan during the period 1957-1965 inclusive.

## III. STATEMENT OF THE SUB-PROBLEM

An analysis of the annual financial statements of the various types of school authorities reveals that there are differences in the patterns of expenditures for educational inputs. As a case in point, transportation is an important item of expenditure in School Units but not in small area authorities.\* In view of this it was decided to compile price indexes for School Units and small area authorities in addition to a provincial price index.

It was also necessary to compile three Instructional Salary Subindexes at each level of

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\* See page 45 for the definition of a small area authority.





aggregation in order to test the effect that some assumptions concerning quality of teaching had on the price levels of teaching services. These assumptions are discussed in detail in that part of the study which deals with the compilation of the Instructional Salary Subindexes.

Subject to the delimitations stated in Chapter 3, the sub-problems may be stated as follows:

1. To compile a set of Education Price Indexes for the Province of Saskatchewan:

- a. Saskatchewan Education Price Index I  
will be compiled by combining Instructional Salary Subindex I with the Other Inputs Subindex.
- b. Saskatchewan Education Price Index II  
will be compiled by combining Instructional Salary Subindex II with the Other Inputs Subindex.
- c. Saskatchewan Education Price Index III  
will be compiled by combining Instructional Salary Subindex III with the Other Inputs Subindex.

2. To compile a set of Education Price Indexes for the School Units:

- a. School Unit Education Price Index I will be



compiled by combining Instructional Salary Subindex I with the Other Inputs Subindex.

b. School Unit Education Price Index II will be compiled by combining Instructional Salary Subindex II with the Other Inputs Subindex.

c. School Unit Education Price Index III will be compiled by combining Instructional Salary Subindex III with the Other Inputs Subindex.

3. To compile a set of Education Price Indexes for the Small Area authorities:

a. Small Area Education Price Index I will be compiled by combining Instructional Salary Subindex I with the Other Inputs Subindex.

b. Small Area Education Price Index II will be compiled by combining Instructional Salary Subindex II with the Other Inputs Subindex.

c. Small Area Education Price Index III will be compiled by combining Instructional Salary Subindex III with the Other Inputs Subindex.



#### IV. STATEMENT OF NEED FOR THE STUDY

According to Benson, schools are strongly affected in their purchases by changes, generally upward, in the price of goods they buy. He reports that while the April, 1960, price index of all wholesale commodities stood at 120.0, price indexes of commodities used in education were much higher: commercial furniture (156.7), paper (145.1), hardware (174.1), paint (128.3), motor vehicles (141.6), and tubes and tires (138.1), (2, pp. 462-3). This points up the fact that the wholesale price index could not be used to measure rising price levels of educational inputs. Although the Dominion Bureau of Statistics maintains several price indexes, it has not compiled a specific price index for education inputs.

Since expenditures for education account for a large portion of provincial budgets and since the public is becoming increasingly concerned about the rising costs of education, it seems desirable that a study of the effect of inflation on these expenditures be undertaken.

Atherton states that the problems posed by price levels of educational inputs are serious and that research in this field could provide school administrators with some of the data they now lack. He is of the opinion that the compilation of educational price indexes is one





of the first steps in providing such data (1, p. 12).

Data obtained from the application of educational price indexes would indicate whether or not real expenditures for education have kept pace with the rising price levels of educational inputs and increased enrollments. Furthermore, these data may lend credence to appeals by school authorities for more funds for education.



## REFERENCES FOR CHAPTER I

1. Atherton, P. J. "Inflation and Educational Finance",  
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2. Benson, Charles S. The Economics of Public Education,  
Boston: Houghton Mifflin Company, 1961.
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## CHAPTER II

### RELATED LITERATURE

#### I. INTRODUCTION

Before undertaking a critical review of education price indexes which have been compiled to date, it was thought appropriate to undertake a cursory consideration of the development of price indexes and the problems inherent in price index construction. Although definitions of terms are given in Chapter III, the definition of a price index at this point should add clarity to the discussion. According to Fisher,

An index number of prices, then shows the average percentage change of prices from one point of time to another. The percentage change in the price of a single commodity from one time to another is, of course, found by dividing its price at the second time by its price at the first time. The ratio between these two prices is called the price relative of that one particular commodity in relation to those two particular times. An index number of prices of a number of commodities is an average of their price relatives (2, p. 3).

#### II. DEVELOPMENT OF PRICE INDEXES

Interest in index numbers has always been greatest in periods of substantial changes in prices and the very invention of the index number device grew out of the



attempt to measure price changes. Carli published what is regarded as the first index number in 1764 to measure the effect that gold and silver, brought from America, had on the purchasing power of money. He used the price of grain, wine, and oil to obtain an index number which represented the average percentage change in prices between the years 1500 and 1750 (3, pp. 370-1).

Interest in price indexes has grown since that time resulting in the compilation of a wide variety of index number series. World Wars I and II gave added impetus to the study of index numbers, while in recent years the continued increase in prices has resulted in further interest.

### III. PROBLEMS OF PRICE INDEX CONSTRUCTION

Atherton lists six problems which must be faced by an index number maker. These are the problems of quality change, choice of base year, choice of formula, selection of commodities to be included in the index, method of weighting the commodities, and the collection of price data (1, p. 31).

#### Problems of Quality Change

One of the fundamental problems in price index construction is that of holding the utility-determining





characteristics of inputs constant over the time span of the index. Griffin states that this problem is not solved and "the construction of an index number requires much ingenuity in order to reach reasonable solutions." (3, p. 374). In the construction of an education price index, the problem of quality arises from two sources, supply and equipment items and personal services.

In discussing the change in quality of supply items, Wasserman is of the opinion that changes in quality are not likely to have any significant effect on the results generated by a school system. Furthermore, few supply items are significant in the expenditure of school districts and as a whole this expenditures category accounts for a minor proportion of expenditures (10, p. 50). In dealing with equipment items, he has this to say:

In various places in the present study, the need has been discussed for holding utility-determining specifications of items constant in collecting price data over an extended period. However, in practice, it would be especially difficult and perhaps impossible to fulfill this condition, except in the loosest way for school equipment items (10, p. 69).

Where a quality change must be considered, such a change can be incorporated into a series by the method of splicing. According to Jaszi:



The essence of the conventional method is to translate quality into quantity by reference to the market price. If a new variety of good is introduced, one physical unit of the new good is not simply equated to one physical unit of the old. Instead one physical unit of the new good is regarded as equivalent to one unit of the old one times the ratio of the price of the new good to that of the old one (4, p. 333).

However, Fisher holds that splicing may be largely or wholly avoided if a new start is begun about once every decade (2, p. 311).

The problem of quality as it relates to personal services is even more complex. As a case in point, teachers' salaries are determined by a salary schedule. The position a teacher occupies on a salary schedule is a function both of years of teaching experience and years of teacher training. It implies nothing about the quality of work given by the teacher. Since a major portion of school expenditures are devoted to teachers' salaries a consideration of these two factors as they relate to the quality of the teaching force is important in the compilation of an education price index.

Although there is no conclusive evidence, widely divergent points of view have been expressed as to the relationship between quality of teachers' services taken as a dependent variable and level of preparation and experience taken as independent variables. One view is that there is no connection between the quality of teachers' services and the level of preparation and years of teaching experience.



An opposite view is that both level of preparation and experience are utility-determining characteristics. Various other points of view can be taken which lie between these two extremes (10, pp. 31-7).

One intermediate position is that years of training is a utility-determining characteristic but that experience is not. Wasserman states that:

. . . most educators associated with elementary and secondary school operations do seem to feel that level of preparation does tend somehow to be positively related to teacher effectiveness throughout the full range of this variable (10, p. 36).

Studies undertaken in Alberta in this regard have been inconclusive (1, p. 35). Evidence relating to experience as a utility-determining characteristic is also inconclusive. However, Atherton states that:

On balance there would appear to be grounds for agreement with Swanson's findings in the United States that "Increased training generally carries with it increased competence; however, increased experience does not necessarily imply increased competence" (1, p. 35).

It follows that the compilation of an education price index requires some assumptions relative to whether or not years of training as it relates to the quality of the teaching force is a utility-determining characteristic. Atherton suggests the following:

An alternative approach to the problem would be to conduct the analysis on two different assumptions. The first assumption would be that all increases in





price were the result of inflationary factors; the second assumption would be that at least part of the increase in price was the result of an improvement in quality. Any difference which resulted in the analysis could then become a measure of the significance of determining the relationship between price and quality change (1, p. 37).

### Problems of Base Year Choice

The base year is the year with which to compare the index numbers for the different years under consideration. Many writers have suggested criteria or requirements in the choice of the base year. Meyers, for instance, suggests four criteria of base-period selection.

1. The base selected should represent some typical or average value.
2. If no one time period can be found which could be considered typical, then an alternative is to average several values of the variable and utilize the mean for the base.
3. It is desirable to select as a base period some past "year" but a year not too far removed from the present.
4. In some index-number series it might well be that the base period chosen is selected to agree with other indices (6, p. 307).

Mudgett takes exception to the emphasis which is placed on the importance of selecting a proper base.

If the index number problem is to find out how much the price level has changed from one period to another, then the base of the index number appears merely as one of the two periods of this binary comparison (8, p. 66).

A base is quite flexible and generally can be



easily shifted. This is accomplished by dividing through the whole series by the original index number for the new base. The result is an index series based on the new base year.

The choice of a fixed period as a base implies that the prices in each year will be compared to those obtaining in the base year. All price relatives using any fixed base share in a common weakness in that it is impossible, without computation, to compare the percentage change between two dates neither of which is the base. Fisher overcame this weakness by developing the chain index. The method of chaining involves taking each year as the base for calculating the index number of the next and then linking the two index numbers by simple multiplication to form a chain of index numbers (2, p. 19). Mudgett points out that one advantage of the chain index in a long-range comparison is that it takes into consideration all adjustments that have been produced in the economy, including commodities that have vanished or been introduced during the period (8, p. 74). However, Fisher cites three reasons why the fixed-base system is preferred to the chain:

1. it is simpler to conceive and to calculate, and means something clear and definite to everybody.
2. it has no cumulative error as does the chain system.



3. graphically it is indistinguishable from the chain system.

Mitchell finds further fault in the chain method in that it fails to distinguish between changes in index numbers which are due to prices and to quantities used as weights (7, p. 113).

### The Problem of Formula Choice

Although Fisher lists one hundred thirty-four different formulae which may be used in index number construction, only twelve are rated as acceptable. In essence, only two formulae are most important to students of economics and statistics who are interested in the theory of index numbers. These two formulae are Laspeyres' and Paasche's (5, p. 292).

Laspeyres' formula utilizes base year weights and compares the price of a collection of goods in the base year period to the price of a similar collection of goods in a given year. Paasche's formula utilizes given year weightings to compare the price of a collection of goods in the given year with the price of a similar collection of goods in the base year. Both formulae may be used to obtain index numbers by the aggregative method or the average method.

In the aggregative method, the comparison is made by dividing the total cost of a collection of goods in a given year by the total cost of the collection





in the base year. Fisher states that "the simple aggregative index number is usually regarded as almost worthless; and so it is, unless the units of measurement are discreetly chosen" (2, p. 40). The better method, which concentrates on the movements of the prices of individual commodities, is the average type. In this case, price changes of commodities are expressed as price relatives, these price relatives then being incorporated into an overall index by the method of weighting which takes into account the importance of each commodity relative to all the commodities.

Wasserman considers the method of weighted average of price relatives to be well adapted to the compilation of an education price index (10, p. 19).

Because the base year weights are fixed, there is some tendency for Laspeyres' formula to yield index numbers which are greater than normal while Paasche's yields index numbers which are less than normal. This is due to the fact that the fixed weighting does not allow for changes in quantities (substitution) as prices rise. This phenomenon should not affect an education price index to any appreciable extent since Wasserman concludes that many inputs in education cannot be substituted for one another, and in general, the inputs involving fixed combinations account for the





the bulk of school district expenditures (10, p. 19).

Although Fisher claims his "Ideal" formula is best, Laspeyres' is the most practical where a substitute has to be used (2, p. 240). Laspeyres' formula is said to have the advantage of ease of calculation and of being easily comprehended by the general public. Fisher claims that neither Laspeyres' nor Paasche's formulae are freakish or biased and concludes that "all index numbers which are not freakish or biased practically agree with each other" (2, p. 306).

#### The Problem of Commodity Choice

In reality, it is virtually impossible to collect data on each commodity in the group due to expense or time. Fisher holds that if the assortment chosen to represent the group is good, the number is not very important (2, p. 336). Wasserman concludes that for an education price index it is pointless to collect data for every item "since sampling can be used to obtain satisfactory measurements of changes in supply prices with a much lower expenditure of money and time" (10, p.51). Karmel notes that a retail price index such as the Australian Consumer Price Index is compiled by selecting a regimen of goods and services which is believed to be representative (or as representative as practicable, given the difficulties of collection,



specifications, etc.) and attaching to the goods and services weights reflecting the pattern of consumers' in some way (5, p. 323). Fisher believes that in order to reduce the error due to sampling by half, the number of commodities must be increased by thirty-five fold (2, p. 336).

### The Problem of Weight Choice

The purpose of weighting is to have each commodity exercise an influence upon the index number proportionate to its relative importance. Fisher, however, does not emphasize the importance of weighting. He states that "If the data for any or all the weights were wrong by 50 percent or 100 percent, the effect on the index number would seldom amount to one percent" (2, p. 342).

Wasserman concludes that since personal services account for a major proportion of school district expenditures, errors in the weighting of this item would result in substantial errors in the index. However, in the case of expenditures for supplies, a ten percent error in weighting would contribute to not more than a one percent error in the index (10, p. 52).

Atherton mentions another relevant point in regard to weighting which should be considered in the



compilation of an education price index:

The expenditure patterns of rural and urban authorities might be expected to show differences because of the relative importance of expenditures on transportation to rural authorities. It would, therefore, not be appropriate to use the same weighting pattern for both rural and urban price indexes (1, pp. 43-4).

### The Problem of Price Data Selection

Fisher claims that original price data should be as accurate as possible, but that the net effect of price data inaccuracies is not as great as one would imagine especially if the number of commodities is large.

If there be 100 commodities and an average or typical group of ten among them are each ten percent too high, the net effect on the index number is to make it only one percent too high. And the chances against all ten thus erring in the same direction is negligible. The errors would probably largely offset each other, so that the probable error in the index number which would result from ten commodities out of 100, each being ten percent wrong, some too high and others too low, would be about one-quarter of one percent (2, p. 341).

Mitchell, among other authorities, appreciates the substantial problem in collecting price data claiming "Only those who have tried to gather from original sources quotations for many commodities over a long series of years appreciate the difficulties besetting the task." (7, p. 25). Wasserman, in commenting upon this same difficulty for education price index construction notes:





. . . A dependence on published series is a matter of necessity, if not choice, for individuals or small groups compiling indexes at state or national levels. The resources of a statistical agency would be required to collect price data from a sample of school districts, on items in an extensive schedule of inputs (10, p. 128).

### Summary

Of the problems besetting any index maker, the one of quality appears to be of greatest significance. The problems of base year, formula, weighting, commodity and price selection are more readily resolved.

The choice of the fixed base, weighted average of price relatives using Laspeyres' formula appears to be the most appropriate for an education price index. Atherton states three reasons for this choice:

1. When used over a relatively short period there would be little distortion of weights.
2. It would be possible to incorporate other series into the index since all major Canadian price index series are constructed by the same method.
3. It will be apparent that the approach has been one used in the development of previous education price indexes.(1, p. 48).

## IV. PRICE INDEXES IN EDUCATION

Few education price indexes have been compiled to date. Except for one compiled for Great Britain and one for Alberta, most education price indexes have been compiled in the United States.





United States Indexes

The National Education Association indexes. The National Education Association in 1926 used the cost of living index to study increased school costs for the period 1914 to 1924. A similar study using the same measuring instrument was completed in 1932 for the period 1914 to 1930. In 1938 the NEA compiled an education price index to study costs of education between 1914 and 1930. This index was of the fixed base, weighted average of price relatives type. The subindexes and their respective weightings are given in Table I. (10, pp. 110-20).

It is interesting to note the various data utilized in the compilation of this index. The subindex for wages and salaries was compiled from the wages of unskilled labor using the rationale that:

. . . if there had been no change at all in teacher qualifications between 1914 and 1930, the trend of the average weekly salary of teachers in those years would have been approximately the same as the trend of the average weekly wages paid to unskilled labor. (10, p. 112).

The textbook subindex was compiled from price data obtained from three major school publishing companies. The instructional supplies subindex was compiled from a list of eleven commodity classes by the method of a weighted average of price relatives. A subindex of prices of house furnishings compiled by the Bureau of



TABLE I  
EXPENDITURE CATEGORIES AND WEIGHTINGS FOR THE  
NATIONAL EDUCATION ASSOCIATION INDEX, 1914-30

EXPENDITURE CATEGORIES	WEIGHT
1. Salaries and Wages	.591
2. Textbooks	.011
3. Supplies	.021
4. Construction	.094
5. Sites	.033
6. Equipment	.027
7. Operation	.041
8. Maintenance	.029
9. Indebtedness and fixed charges	.105
10. Transportation	.041
11. Other coordinate activities	.007
12. Combined index	1.000

Source: Adapted from National Education Association, "Why Schools Cost More", Research Bulletin, (May, 1938), p. 147. (Wasserman, p. 112)



Labor Statistics for its cost of living index was used for the equipment subindex. The NEA transportation subindex was compiled from three published series: an index of motor vehicle prices, an index of wholesale prices of tires and tubes, and an index of prices of gasoline at filling stations. (10, pp. 110-20).

Woollatt's indexes. (10, p. 121). Woollatt's first price index, published in 1953, covered the school years 1939-40 through 1951-52. Woollatt's procedure differed from that of the NEA in that he only considered items which could be classified as current expenditures. Two categories, salary and nonsalary, were considered and an index was compiled for each weighted at .80 and .20 respectively. These were then combined into an overall price index. His salary subindex was developed from two available series: the consumer price index published by the Bureau of Labor Statistics and a series on median salary level in village superintendency districts in New York State for beginning teachers with four years of training beyond high school. An index number for each year was obtained by averaging the two numbers for each year. The nonsalary index was compiled from four subindexes in the wholesale price index: pulp and paper, building materials, fuel and lighting



materials, and home furnishings.

In the Baltimore studies of 1957 and 1958, Woollatt again developed the overall index from two subindexes: salary and nonsalary. This time the salary subindex was developed from two subindexes, one for professional personnel weighted at .70, and one for classified personnel weighted at .10. The professional component was based on the median annual salary paid in eighteen large cities for beginning elementary school teachers having four years of college training. The average hourly wage of bricklayers, carpenters, and structural ironworkers in twenty cities was used to develop the classified component.

The nonsalary index was compiled from wholesale price indexes for paper (weighted at .0572), prepared paint (weighted at .0224), lumber and wood products (weighted at .0224), concrete products (weighted at .0224), household furniture (weighted at .0302), and fuel, power, and lighting materials (weighted at .0454).

New York Education Department indexes. (10, pp.124-6). The subindexes, published series used, and the weights of the various components of this index are given in Table II. Although data on teachers' salaries were available, these were not used in order to prevent the





TABLE II  
SUBINDEXES, PUBLISHED SERIES AND WEIGHTS USED  
FOR THE NEW YORK STATE EDUCATION DEPARTMENT INDEX

Subindex	Published Series	Weight
I Professional workers	Median income of salaried professional, technical, and kindred workers 14 years of age or over	.7785
II Service Workers	Median income of male service workers (other than in private households) 14 years of age or over	.0615
III Clerical Workers	Median income of female clerical and kindred workers 14 years of age or over.	.0371
IV Textbooks, instructional and office supplies	Wholesale price sub-index for "paper except newsprint"	.0406
V Upkeep and Maintenance	U.S. Department of Commerce composite construction cost index	.0423
VI Utilities	Wholesale price subindex for "fuel, power, and lighting materials"	.0282
VII Miscellaneous	Wholesale price index for "all commodities"	.0118

Source: Gerald J. Boyle, The Cost of Education Index.  
Albany: The State Education Department, 1959.  
(Wasserman, p. 125)



possibility of "self-generating" effects in the index.

The Nevada Price Index. (1, pp. 54-5). An index developed in 1964 for Nevada is intended for use in adjusting school grants. The subindexes, published series, and weights used are given in Table III.

Hirsch's Index. (10, pp.131-2). Hirsch developed an index based solely on teachers' salaries and used this as an education price index to study school expenditures between the years 1900 and 1958. The analysis indicated that while actual expenditures increased 56-fold between 1900 and 1958, the increase of the salary adjusted series extended merely from about \$2.3 million to \$9 million - - less than fourfold.

#### Vaizey's Index

Vaizey compiled a comprehensive price index consisting of twenty-two subindexes for the United Kingdom for the period 1920-55. Differences in teachers' qualifications were considered in the construction of the teachers' salary subindex. Price relatives for two subindexes were derived from published series, those for the remaining subindexes were calculated from local data.



TABLE III

SUBINDEXES, WEIGHTS AND PUBLISHED SERIES USED IN  
NEVADA STATE DEPARTMENT INDEX

Subindex	Published Series	Weight
Professional Salaries Administration	Census median income of "Salaried Professional, Technical and Kindred Workers, Male Only."	.0111
Clerical Salaries	Census median income of "Clerical and Kindred Workers, Female."	.0072
Other Expenses	Wholesale Price Index of "Commodities Other Than Farm Products and Food."	.0042
Professional Salaries Instruction	Census median income of "Salaried Professional, Technical and Kindred Work- ers, Female Only."	.7052
Clerical Salaries	Same as Clerical Salaries, Administration.	.0214
Teaching Materials	Pulp, Paper and Allied Products Index, and Aver- age Gross Weekly Earnings of Publishing and Allied Industries	.0552
Other Expenses	Same as Other Expenses, Administration	.0053
Transportation Salaries	Census median income of "Operative and Kindred Workers, Male Only."	.0120
Other Expenses	Motor Vehicles Index	.0215



TABLE III (Continued)

Subindex	Published Series	Weight
Salaries, Plant Operation	Census median income of "Service Workers, Excluding Private Households, Male Only."	.0573
Heat Buildings	Wholesale Price Inces of "Fuel, Power and Related Products Index."	.0137
Utilities Except Heat	Average Weekly Earnings, Telephone Communications, and Electric Power Index	.0221
Other Expenses	Same as Other Expenses (Administration)	.0068
New Vehicles	Motor Vehicles Index	.0042
Salaries Attendance Workers	Census median income of "Unskilled Workers (Non-Extractive)."	.0030
Other Expenses, Attendance	Same as Other Expenses (Administrative)	.0004
Salaries, Health Personnel	Same as for Professional Salaries, Instruction	.0077
Other Expenses, Health	Same as for Other Expenses (Administrative)	.0007
Salaries, Maintenance Workers	Census median income of "Craftsmen, Foremen and Kindred Workers, Male Only."	.0161
Other Expenses, Maintenance	Same as for Other Expenses (Administrative)	.0251

Source: Adapted from Sub-Committee on Educational Finance Proposed Nevada Price Index. Reno: State Department of Education, 1964. (Atherton, pp. 55-6)







### The Alberta Education Price Index

The only education price index compiled in Canada to date is one completed by Atherton in 1968 for the Province of Alberta for the period 1957-65 inclusive. This index is unique in that it consists of a series of indexes compiled for the province as a whole, for large rural areas and for small areas which include cities and towns. The indexes are of the fixed base year, fixed weight variety and were compiled using Laspeyres' formula. The major subindexes and their weightings for the three areas considered are given in Table IV. The major non-instructional salary subindexes were combined into an "other inputs" subindex.

Weighting data for the various major subindexes were obtained from Annual Reports of the Department of Education. Weightings for major inputs of the subindexes were obtained, where possible, from auditor's reports of a sample of school authorities. In the case of the Instructional Supplies Subindex, weighting data for the Supplies and Aids component had to be obtained from a local supply house. Weighting data for the Repairs component of the Plant Operation and Maintenance Subindex were obtained from the Alberta Public Works Department. Weighting data for all components of the Transportation Subindex were obtained from the Alberta School Bus



TABLE IV  
SUBINDEXES AND WEIGHTS FOR THE VARIOUS AREAS  
IN THE ALBERTA EDUCATION PRICE INDEX

Subindex	Provincial	Small Area	Large Area
Instructional Salaries	.615	.710	.545
Administration	.027	.028	.026
Instructional Supplies and Aids	.043	.046	.038
Plant Operation and Maintenance	.155	.181	.136
Transportation	.137	.009	.232
Auxiliary Services	.006	.002	.008
Other Expenditures	.017	.024	.015
Totals	1.000	1.000	1.000

Source: Adapted from P.J. Atherton "The Impact of Rising Price Levels on Expenditures for School Operations in Alberta, 1957-65" (Unpublished PhD. thesis, University of Alberta, 1968) p.82.



Operators' Association. The base year for the latter weightings was 1966, the first year such information was available.

Various assumptions made about the quality of the teaching force as a utility-determining characteristic necessitated the compilation of three Salary Subindexes. Salary Subindex I was compiled on the assumption that years of training as it relates to the quality of teaching force was not a utility-determining characteristic. Salary Subindexes II and III were developed on the assumption that years of training as it relates to quality was a utility-determining characteristic. Salary Subindex II was compiled on the basis of two levels of utility, teachers with three years of training and holding Permanent Certificates (weighted at .3066) and teachers holding less than Permanent Certificates (weighted at .6934). Salary Subindex III was developed on the basis of three levels of utility: teachers holding Professional Certificates (weighted at .3066), teachers with Standard Certificates (weighted at .1616) and teachers holding other Certificates (weighted at .5318). Salary data for these indexes were derived directly from the Annual Reports of the Department of Education.

The Administrative Subindex consisted of five



components: Officials' Salaries, Clerical Salaries, Office Supplies, Utilities, and Other Expenditures. Salary data for non-professional accountant-office supervisors as published by the Alberta Bureau of Statistics were used to measure price changes in officials' salaries while salary data contained in the same publication for clerks were used to measure price changes in clerical salaries. Price movements in the Office Supplies component were represented by the cost of 8-1/2 x 11 inch duplicating paper (18 lb. weight). The Wholesale Price Index for "Fully and Chiefly Manufactured Goods" of the Dominion Bureau of Statistics was used to measure price changes in the "Other Expenditures" component. The price level of utilities was held constant throughout the period under study.

The Instructional Supplies Subindex was composed of Correspondence Courses, Books, and Supplies and Equipment. All price data were obtained at the local level.

The Plant Operation and Maintenance Subindex consisted of the following components: Caretakers' Wages, Supplies, Utilities, and Repairs. Atherton used average wages for male janitors employed in institutions in Alberta obtained from the average wage series of the Alberta Bureau of Statistics for his caretakers' wages





price data. Price relatives for supplies were obtained from the Industrial Selling Price Index of the Dominion Bureau of Statistics. The price of utilities was found to have remained stable over the period. The Repairs component consisted of wages (weighted at .66) and construction (weighted at .33). Price data were obtained from the Non-residential Building Materials Index and the Construction Wage Index of the Dominion Bureau of Statistics.

The components of the Transportation Subindex were Drivers' Wages, Depreciation, Gas and Oil, Tires, Repairs, and Fees. Price data for the wage component were derived from the hourly rate for medium truck drivers as reported by the Alberta Bureau of Statistics. Price relatives for depreciation were computed from the annual price of a 48 passenger school bus. Price data for gas and oil, fees and insurance were obtained locally while that for tires and repairs were derived from the Calgary-Edmonton automobile operation component of the Consumer Price Index.

Average monthly salaries of nurses as published by the Alberta Bureau of Statistics was used to calculate price relatives for the Auxiliary Services Subindex.

Price relatives for the Other Expenditures Subindex were derived from the Wholesale Price Index for



"Fully and Chiefly Manufactured Goods" of the Dominion Bureau of Statistics.

The overall Alberta Education Price Indexes as compiled by Atherton are set forth in Table V.

In Atherton's opinion, the substantial differences among the three Salary Subindexes

. . . suggests that making assumptions about the relationship between teacher quality and price level increase can have considerable influence on conclusions reached after any analysis of the effect of rising price levels on educational expenditure. (1, pp. 139-41).

A comparison of the Alberta Education Price Index with the Consumer Price Index showed that "whilst it cost 13.7 percent more in 1965 to maintain the 1957 standard of living, it cost 45.5 percent more to provide the 1957 standard of education (1, p. 213).

### Summary and Conclusions

All index series developed for education have used the weighted average of price relatives method and Laspeyres' formula. Two of the indexes, Vaizey's and Atherton's attempted to make allowances for changes in the quality of the teaching force. Only Atherton attempted to make allowances for urban and rural differences in expenditures. Finally, published series were incorporated to some extent in the construction of all indexes for education.



TABLE V

## ALBERTA EDUCATION PRICE INDEXES

Year	Provincial				Small Area			Large Area		
	Index I	Index II	Index III	Index III	Index I	Index II	Index III	Index I	Index II	Index III
1957	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1958	106.62	106.77	106.76	106.76	108.00	108.18	108.18	105.57	105.70	105.69
1959	115.40	115.79	115.81	115.81	116.34	116.80	116.82	114.70	115.05	115.06
1960	122.74	122.41	122.26	122.26	123.91	123.54	123.38	121.79	121.50	121.38
1961	129.26	128.35	128.06	128.06	131.29	130.24	129.90	127.73	126.92	126.66
1962	133.18	131.24	130.80	130.80	135.52	133.27	132.76	131.45	129.72	129.33
1963	136.53	134.00	133.45	133.45	139.27	136.35	135.71	134.44	132.20	131.71
1964	141.60	137.62	136.69	136.69	144.41	139.71	137.74	139.49	135.96	135.14
1965	145.52	140.15	139.39	139.39	148.82	142.61	141.74	143.07	138.30	137.63

Source: Adapted from P. J. Atherton, "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta", Unpublished PhD. thesis, University of Alberta, 1968, pp. 134,135,137.



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## CHAPTER III

### RESEARCH PROCEDURES

#### I. INTRODUCTION

Since the compilation of the Education Price Indexes is described in detail in the following chapter, it is necessary at this time to present only a brief outline of the methodology used and the restrictions placed on the study. Consequently, this chapter deals with the choice of formula, an overview of the compilation, data collection and analysis, delimitations, limitations, and definitions basic to the study.

#### II. FORMULA CHOICE

The Education Price Indexes were compiled using Laspeyres' formula which is of the fixed base year, fixed weight type. The use of this formula necessitated the choice of a base year which in this study was taken as 1957. Furthermore it required that the weighting of components in the base year be held constant throughout the study. Thus the weightings of the expenditures considered in this study were held constant at their 1957 level.



The selection of 1957 as the base year for the Saskatchewan Education Price Indexes was deliberate in order that the period under study coincide with that of other education price indexes either completed or under completion at this university. Theoretically, the year selected as the base should be a typical year. Tables VI, VII, and VIII give the breakdown of expenditures by major category for school authorities at the three levels of aggregation for the nine years under study.

An examination of Table VI revealed that at the provincial level, the greatest fluctuation as a percentage of total expenditures occurred in conveyance which moved from 8.0 percent in 1957 to 12.9 percent in 1965. Table VII revealed that expenditures of small area authorities remained relatively stable throughout the period with the greatest change occurring in Plant Operation and Maintenance which decreased from 18.3 percent of total expenditures in 1957 to 15.3 percent in 1965. Table VIII revealed a greater fluctuation in expenditures of School Units. Expenditures for conveyance increased 9.0 percent from 11.7 percent of the total in 1957 to 20.7 percent in 1965. Plant Operation and Maintenance expenditures decreased 4.6 percent over the period while Instruction expenditures decreased 4.5



TABLE VI

OPERATING EXPENDITURES OF SASKATCHEWAN PROVINCIAL SCHOOL AUTHORITIES 1957-65  
(Thousands of Dollars)

Year	Administration	Instruction	Plant Operation and Maintenance	Conveyance	Fees and Auxiliary Services
1957	\$1,334	\$28,400	\$ 7,059	\$ 3,265	\$ 544
%	3.3	70.0	17.4	8.0	1.3
1958	1,545	32,472	7,539	3,874	626
%	3.4	70.5	16.4	8.4	1.4
1959	1,684	35,554	8,054	4,815	733
%	3.3	69.9	15.8	9.5	1.4
1960	1,893	38,609	8,819	5,727	934
%	3.4	69.0	15.8	10.2	1.7
1961	2,021	41,989	9,094	6,405	1,090
%	3.3	69.3	15.0	10.6	1.8
1962	1,967	45,052	9,587	7,350	1,248
%	3.0	69.3	14.8	11.3	1.9
1963	1,962	48,430	10,240	8,134	1,378
%	2.8	69.0	14.6	11.6	2.0
1964	2,196	53,000	10,893	9,550	1,606
%	2.8	68.6	14.1	12.4	2.1
1965	2,579	59,574	11,864	11,301	2,434
%	2.9	67.9	13.5	12.9	2.8

Source: Province of Saskatchewan, Department of Education, Annual  
Reports for 1958-1966



TABLE VII

OPERATING EXPENDITURES OF SASKATCHEWAN SCHOOL UNITS 1957-1965  
(Thousands of Dollars)

Year	Administration	Instruction	Plant Operation and Maintenance	Conveyance	Fees and Auxiliary Services
1957	\$ 871	\$17,415	\$4,413	\$ 3,053	\$ 352
1958	3.3	66.7	16.9	11.7	1.4
1958	963	19,813	4,550	3,681	385
1959	3.3	67.4	15.5	12.5	1.3
1959	1,012	21,037	4,695	4,611	419
1960	3.2	66.2	14.8	14.5	1.3
1960	1,118	22,214	4,869	5,504	496
1961	3.3	65.0	14.2	16.1	1.5
1961	1,182	23,895	4,975	6,159	689
1962	3.2	64.8	13.5	16.7	1.9
1962	1,190	25,009	5,284	7,084	708
1963	3.0	63.7	13.5	18.0	1.8
1963	1,221	26,266	5,561	7,805	747
1964	2.9	63.1	13.4	18.8	1.8
1964	1,338	29,384	5,896	9,180	927
1965	2.9	62.9	12.6	19.6	2.0
1965	1,416	32,566	6,449	10,820	1,080
1965	2.7	62.2	12.3	20.7	2.1

Source: Province of Saskatchewan, Department of Education, Annual Reports for 1958-1966





TABLE VIII

OPERATING EXPENDITURES OF SASKATCHEWAN SMALL AREA SCHOOL AUTHORITIES 1957-1965  
(Thousands of Dollars)

Year	Administration	Instruction	Plant Operation and Maintenance	Conveyance	Fees and Auxiliary Services
1957	\$ 463	\$10,985	\$2,647	\$212	\$ 192
%	3.2	75.8	18.3	1.5	1.3
1958	583	12,660	2,989	193	241
%	3.5	77.0	17.9	1.2	1.4
1959	672	14,517	3,360	204	314
%	3.5	76.1	17.6	1.1	1.6
1960	774	16,394	3,950	223	439
%	3.6	75.3	18.1	1.0	2.0
1961	839	18,094	4,119	246	401
%	3.5	76.3	17.4	1.0	1.7
1962	779	20,044	4,304	266	540
%	3.0	77.3	16.6	1.0	2.1
1963	741	22,165	4,679	329	630
%	2.6	77.7	16.4	1.2	2.2
1964	857	23,617	4,997	371	678
%	2.8	77.4	16.4	1.2	2.2
1965	1,163	27,007	5,415	481	1,354
%	3.3	76.2	15.3	1.4	3.8

Source: Province of Saskatchewan, Department of Education, Annual Reports for 1958-1966



percent in the same period. This relative stability of the pattern of expenditures confirms the observation made earlier that expenditures for educational inputs are more or less fixed. Tables VI, VII, and VIII confirm that 1957 was a typical year during 1957-65 and hence appropriate as a base year.

Although patterns of expenditures of the major categories were relatively stable, it is recognized that there may have been fluctuations of patterns of expenditures within each category. Holding the weighting of expenditures constant at the 1957 level does not nullify the study; instead it may limit the application of the findings. Further, all indexes of the Dominion Bureau of Statistics are compiled using Laspeyres' formula which requires holding weightings constant at the base year.

### III. AN OVERVIEW

This section describes the general procedures which were followed in developing the overall indexes.

Expenditures for educational inputs were grouped into major categories which constituted major subindexes. Each major subindex was weighted in order to reflect its relative importance in the overall index. Since each major subindex represented a variety



of goods and services, one or more of these were selected to represent the movement of prices within the group. The goods and services selected as components in each major subindex were priced for each year of the study and the prices expressed as price relatives. Each price relative was then weighted to reflect the relative importance of that good or service. The weighted price relatives of all components within each major subindex were then summed for each year to obtain the index number for each major subindex for each year. The major subindexes were combined by the method of a weighted average of price relatives into an overall index.

For the purposes of this study, all major subindexes with the exception of the instructional salary subindex were further combined into one major subindex designated as the Other Inputs Subindex.

#### IV. DEFINITIONS

Terms used in connection with this study are defined below.

Price relative. The percentage change in the price of a single commodity from one time to another is found by dividing its price at the second time by its price at the first time. The ratio between the



two prices is called the price relative of that particular commodity in relation to those two particular times (2, p. 3).

Weight. The weighting for a single input is the quotient of the expenditure on that input and the total expenditure.

Weighted price relative. A weighted price relative is the number obtained by multiplying a price relative by its weight.

Index number. An index number can be defined as the sum of the weighted price relatives of a number of goods and services.

Price index. A price index can be defined for the purpose of this study as a series of measurements, expressed as percentages, of the relationship between the average price of a group of goods and services at a succession of dates and the average price of a similar group of goods and services at a common date (3, p. 63).

School Unit. Saskatchewan is organized into sixty large administrative units called School Units. These School Units were formed by combining many small rural districts and, in many cases, village and town districts.





Small area authorities. Small area authorities for the purpose of this study are defined as city districts including collegiate institutes, government-aided schools, northern areas of administration, and those town, village, and small rural districts not included in School Units. These authorities allocated less than 11.5 per cent of current operating expenditures in 1957 for transportation.

Utility-determining characteristic. A utility-determining characteristic is one in which a change in the characteristic would affect the educational results by making them either more preferable or less preferable.

## V. DELIMITATIONS

This study is delimited to an examination of increasing price levels of educational inputs classified as current operating expenditures, exclusive of debt service costs and capital expenditures of all school boards in Saskatchewan during the period 1957-67 inclusive. It is based on the 1957 expenditure data of a sample of forty-two of a possible fifty-six School Units and nine city districts out of a possible eighteen. The sample represents those school authorities who responded to a request for these data.



## VI. LIMITATIONS

Because of the delimitations and the assumptions which follow, it is felt that this study is applicable to school systems in the aggregate in the Province of Saskatchewan. Thus the findings cannot be applied to a particular school authority nor to a system or aggregate of systems outside of Saskatchewan, nor to a period of years other than 1957-1965 inclusive.

## VII. ASSUMPTIONS

Two major assumptions which follow are applicable to all school boards in the province.

1. It was assumed that the rates of price increase for goods and services affected all school authorities equally.

2. It was assumed that there has been no change in the quality of inputs of goods and services other than teaching services and that increases in prices are due to inflationary pressures.

Further assumptions were made regarding the relationship between years of training, as reflected by certification level, and the price and quality of teaching services. These assumptions were made to test their effect on the measurement of price levels of teaching services and were not an essential part



of the basic study. These assumptions are discussed in detail in that part of the study which deals with the compilation of the Instructional Salary Subindexes.

Some may take exception to the first major assumption, above. However, it was recognized that some school authorities received substantial discounts on some inputs. Atherton holds that an index will not be distorted by discounts, since discounts influence the total expenditures for these inputs but not changes in their price level (1, p. 107).

#### VIII. DATA COLLECTION

##### Expenditure Data

Expenditure data were required as a basis for weighting both the major and component subindexes.

The expenditure data required to determine major subindex weightings were available at the provincial level and were taken from the Annual Reports of the Department of Education. However, expenditure data for the various components which made up the major subindexes were lacking at the provincial level. In view of this, it was decided to request each School Unit and city school board for a copy of their 1957 annual financial statement. Forty two School Units and nine city school boards



responded to this request and with the exceptions noted below, the component weightings were derived from this sample.

Component weightings for the Transportation Subindex were not available for the year 1957. Two School Units, Lloydminster and Milestone, were contacted and agreed to furnish weighting data for 1968. Component weightings for the Maintenance component of the Plant Operation and Maintenance Subindex were arrived at after discussions with a local contractor. Weightings for the school supplies component subindex of the school supplies component of the Instructional Supplies and Equipment Subindex were obtained from Moyer Division of Vilas Industries.

#### Price Data

Both government publications and price lists of local companies were utilized in obtaining price data.

Price data for teachers' salaries were obtained from Annual Reports of the Department of Education. Price data for labor inputs other than teachers' salaries were obtained from the Wage Rates, Salaries and Hours of Labor publication of the Department of Labour.





Price data for the Transportation Subindex were obtained as price relatives from the Prices Division of the Dominion Bureau of Statistics. Price data for the janitor supplies, building materials, utilities and insurance components of the Plant Operation and Maintenance Subindex were also obtained as price relatives from various published series of the Dominion Bureau of Statistics. Published series were also utilized for miscellaneous expenditures components and for the Auxiliary Services Subindex.

Price data for the advertising component of the Administrative Subindex were obtained from the Saskatoon Star-Phoenix.

Price data for the books component of the Instructional Supplies and Equipment Subindex were obtained from Book Lists of the Saskatchewan Book Bureau, for school supplies from Moyer Division, Vilas Industries, and for sports supplies and other inputs from published series of the Dominion Bureau of Statistics.



## REFERENCES FOR CHAPTER III

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2. Fisher, Irving. The Making of Index Numbers. New York: Houghton Mifflin Company, 1922.
3. Research Division of the American Institute of Certified Public Accountants, Reporting the Financial Effects of Price Level Changes.



## CHAPTER IV

### THE SASKATCHEWAN EDUCATION PRICE INDEXES

#### I. INTRODUCTION

This chapter describes the compilation of the Saskatchewan Education Price Indexes. The procedure followed is modelled on that developed by Atherton for his Alberta Education Price Indexes (1, pp. 63-138).

The first section deals with the guiding principles used in the construction of the Indexes. The second section describes the methodology used and the stages in the construction of the Indexes. Included in the second section is a description of the method used to assess the impact of changing levels of teacher qualifications on the price levels of instructional salaries. The third section provides the details of construction of the major subindexes while the fourth section describes the compilation of the overall indexes from the major subindexes.

#### II. AN OVERVIEW

In order to analyze the operating expenditures of school boards, it was necessary to compile three separate sets of price indexes; one to measure the



the increase in price level of inputs of school boards in the province as a whole, another to measure the increase in price level of inputs of School Unit boards and the third to measure price level increases of inputs of small area school boards.

The three sets of indexes have been designated:

The Provincial Indexes

The School Unit Indexes

The Small Area Indexes

Two guiding principles were followed in the construction of these indexes. The first principle was that all data should be collected at the highest possible level of aggregation. Thus, wherever possible, weighting data were obtained from Annual Reports of the Saskatchewan Department of Education. Where weighting data were not available from this source, it was obtained from the annual financial statements of a sample of school authorities.

The same principle was followed in the collection of price data. Although a portion of price data was obtained at the provincial level, it was impossible to obtain all of it at this level of aggregation. Hence some reliance was placed on published series of





the Dominion Bureau of Statistics for price data in the form of price relatives and on wage series of the Dominion Department of Labour.

Price data for labor inputs were also obtained at the provincial level. Data relating to teachers' salaries were available in the Annual Reports of the Department of Education. The main source of price data for other labor inputs was the annual Dominion Department of Labour publication Wage Rates and Salaries since such data were not available from the Saskatchewan Department of Labour. For the most part these data were available for only four cities in the province: Moose Jaw, Regina, Saskatoon, and Prince Albert.

It is recognized that there could be some discrepancy between the wage data used and the actual wages received by non-teaching personnel. However, it must be pointed out that the study was not concerned with actual wages, but rather with the increase in wage rates. If one accepts the fact that there is some degree of mobility in the labor market, then the wage data used should be indicative of that prevailing in the educational sector under study.

A second general principle was that the system of input classification used by the Department of Education in reporting school board expenditures be



followed wherever possible.

### III. METHOD OF CONSTRUCTION

The Saskatchewan Education Price Indexes are similar in construction to the Alberta Education Price Indexes (pp. 29-34 supra). Each index was compiled from a series of major subindexes which represented major categories of school board expenditures. Each major subindex was compiled from a series of component subindexes which represented a homogeneous group of inputs within each category.

The indexes are of the fixed base year, fixed weight variety and were compiled by the method of a weighted average of price relatives using Laspeyres' formula.

#### Major Subindexes

The system of inputs classification used by the Department of Education is as follows: administration, instruction, plant operation and maintenance, fees, conveyance and related services, and auxiliary services.

Teachers' salaries are included under the heading of instruction. Since this expenditure accounted for a large portion of school board expenditures and since various assumptions about the effect



of changing quality of teaching services as it related to the increase in price levels were tested, it was decided to remove this component from "Instruction" and form a separate major subindex. The remaining expenditures listed under "Instruction" were then placed in another major subindex designated "Instructional Supplies and Equipment". The second departure from the classification used by the Department of Education was the combining of the fees and auxiliary services expenditures. This was done because of the small proportion of total operating expenditures devoted to these two components.

Thus each of the indexes was compiled from six major subindexes:

1. A salary subindex
2. An administration subindex
3. An instructional supplies and equipment subindex
4. A plant operation and maintenance subindex
5. A conveyance subindex
6. A fees and auxiliary services subindex

Each major subindex was, in turn, compiled from a number of component subindexes.



### Component Subindexes

As previously stated, each major subindex is composed of a number of components which represent a combination of a variety of goods and services. Thus it was necessary to select the goods and services which would be used to represent the particular components. The selection having been completed, it was then necessary to compile a series of subordinate price indexes which would measure the price fluctuations of each component.

These price indexes were designated as component subindexes to differentiate them from the major subindexes.

### Steps in Major Subindex Construction

Each major subindex was compiled in four steps.

Step I. Each component subindex was assigned a weight reflecting its relative importance in the pattern of expenditures of the particular major subindex.

Step II. Each component was priced for each year from 1957 to 1965 and the price data were expressed as price relatives.

Step III. Each component price relative was multiplied by the weighting of that component to yield a weighted price relative for each year.





Step IV. The weighted price relatives were summed to provide a major subindex value.

#### Training and Quality in the Teaching Force

Although there is no conclusive evidence that years of training as it relates to the quality of the teaching force is a utility-determining characteristic, it is possible to measure the effect this assumption would have on rising price levels if such a relationship did exist. The effect of such a relationship could be measured by making various assumptions about years of training as a utility-determining characteristic and then developing separate salary subindexes based on each assumption. This approach has been used in the compilation of the Instructional Salary Subindexes of the Saskatchewan Education Price Indexes.

Assumptions. The Instructional Salary Subindexes were developed around two alternate assumptions:

1. Years of training is not one of the utility-determining characteristics in the quality of teaching services.
2. Years of training is one of the utility-determining characteristics in the quality of teaching services.



It was decided to represent years of training by level of certification as determined by the Department of Education. The relationship between years of training and certification is given in Table IX.

Table IX shows that although there are six types of certificates issued by the Department of Education, these can be grouped into three levels which qualify teachers for different types of certification: one year of training, two years of training, and four or more years of training.

Instructional Salary Subindex I. Instructional Salary Subindex I was compiled on the basis of the first assumption. In this case years of training was not considered a utility-determining characteristic in the quality of teaching services and hence any increase in teachers' salaries was considered an increase in price level.

Instructional Salary Subindex II. Instructional Salary Subindex II was compiled on the basis of the second assumption. In this case two levels of utility were considered. The first level represented teachers with four or more years of training holding Professional Certificates while the second level represented teachers with less than four years of training holding



TABLE IX

RELATIONSHIP BETWEEN TYPE OF TEACHING CERTIFICATE  
AND YEARS OF UNIVERSITY TRAINING

Certificate <sup>1</sup>	Years of Training <sup>2</sup>
Group 1	
Professional	4 <sup>+</sup>
Group 2	
Standard	2
Group 3	
Interim Standard	1
Second Class	1
Special	1
Provisional	1

<sup>1</sup>Province of Saskatchewan, Department of Education,  
Annual Report, 1956-57

<sup>2</sup>Saskatchewan Regulations 303/68, August 14, 1968.



certificates other than Professional. In the compilation of Instructional Salary Subindex II, the average salaries of the two groups of teachers were considered indicative of the price level of the two different components.

Instructional Salary Subindex III. This subindex was also compiled on the basis of the second assumption but three levels of utility were considered. The first level represented teachers with four years or more of training and holding Professional Certificates. The second level represented teachers with two but less than four years of training and holding Standard Certificates. The third level of utility represented teachers with less than two years of training and holding certificates other than Professional or Standard. The average salary of teachers in each group was taken as indicative of the price level of the three different components.

#### Stages in the Compilation

Since it was necessary to compile three different sets of indexes to measure price level increases in inputs of school authorities at three levels of aggregation, a total of nine separate price indexes





were compiled. These were arranged in three groups of three as follows:

1. A Provincial Education Price Index compiled with Instructional Salary Subindex I.  
A Provincial Education Price Index compiled with Instructional Salary Subindex II.  
A Provincial Education Price Index compiled with Instructional Salary Subindex III.
2. A School Unit Education Price Index compiled with Instructional Salary Subindex I.  
A School Unit Education Price Index compiled with Instructional Salary Subindex II.  
A School Unit Education Price Index compiled with Instructional Salary Subindex III.
3. A Small Area Education Price Index compiled with Instructional Salary Subindex I.  
A Small Area Education Price Index compiled with Instructional Salary Subindex II.  
A Small Area Education Price Index compiled with Instructional Salary Subindex III.

It was decided to follow Atherton's procedure and distinguish between two groups of inputs: teaching services and inputs other than teaching services. The first major group of inputs consisted entirely of teachers' salaries while the remaining



second major group consisted of the remaining five major subindexes. This latter group was designated as the Other Inputs Subindex.

The Saskatchewan Education Price Indexes were compiled in four stages:

- Stage 1. The three salary subindexes were compiled.
- Stage 2. The other five major subindexes were compiled.
- Stage 3. The other five major subindexes were then combined by means of different weighting patterns into three subindexes for other inputs: A Provincial Subindex for Other Inputs, A School Unit Subindex for Other Inputs and a Small Area Subindex for Other Inputs.
- Stage 4. Each of the three subindexes for Other Inputs was combined with each of the three respective Instructional Salary Subindexes to yield the nine Saskatchewan Education Price Indexes specified above.



### Weighting Patterns for Major Subindexes

The weighting patterns for combining the major subindexes into the final indexes were determined from expenditure patterns of school systems at the three levels of aggregation. Some of the required information was obtained from Annual Reports of the Department of Education and these data together with the percentage breakdown were set out in Tables VI page 39, Table VII page 40, and Table VIII page 41.

As stated previously, expenditures on teachers' salaries and instructional materials are shown in Annual Reports under the single heading "Instruction". This necessitated obtaining the expenditure patterns of these two categories from the annual financial statements of the sample of school authorities. Table X indicates the method used to determine the percentage breakdown for the Instructional Salaries Subindex and the Instructional Supplies and Equipment Subindex at each of the three levels of aggregation.

Once the percentage breakdown of base year expenditures had been obtained, it was necessary to convert each percentage to a decimal to obtain the weight of each major subindex in each of the three indexes.



Instructional Salary Subindex weights. Table X shows that expenditures on teachers' salaries accounted for 66.3 per cent of provincial operating expenditures for education in the base year 1957. In the same year, School Unit expenditures for instructional salaries amounted to 63.3 per cent of total operating expenditures. Small area school authorities allotted 71.8 per cent of total operating expenditures for instructional salaries.

Thus the weights for the Instructional Salary Subindexes which were used in the compilation of the overall indexes were as follows:

Provincial Instructional Salary Subindex	.663
School Unit Instructional Salary Subindex	.633
Small Area Instructional Salary Subindex	.718

Administration Subindex weights. Table VI, page 39, shows that at the provincial level expenditures for administration accounted for 3.3 per cent of total operating expenditures in the base year. It also indicates that expenditures for administration have remained relatively stable over the nine-year period, the greatest variation being 0.60 per cent. Table VII indicates that at the School Unit level of aggregation 3.3 per cent of total operating expenditures were directed towards administrative costs. Again, expend-





TABLE X

WEIGHTING DATA FOR THE INSTRUCTIONAL SALARY SUBINDEX AND THE INSTRUCTIONAL SUPPLIES AND EQUIPMENT SUBINDEX AT THE PROVINCIAL, SCHOOL UNIT, AND SMALL AREA LEVELS OF AGGREGATION (1957)

Level of Aggregation	Instruction <sup>1</sup> % (1)	Instructional Salaries <sup>2</sup> 10 <sup>3</sup> dollars (2)	Instructional Salaries <sup>2</sup> % (3)	Instructional Supplies and Equipment <sup>3</sup> 10 <sup>3</sup> dollars (4)	% (5)	Instructional Salaries <sup>4</sup> % (6)	Instructional Supplies and Equipment <sup>5</sup> % (7)
Provincial	70.0	17,035	94.8	932	5.20	66.3	3.7
School Unit	66.7	11,961	94.9	649	5.10	63.3	3.4
Small Area	75.8	5,075	94.7	283	5.30	71.8	4.0

<sup>1</sup>Tables VI, VII, and VIII

<sup>2,3</sup>Annual financial statements of school authorities in the sample

<sup>4</sup>Column 6 is derived by multiplying Columns 1 and 3

<sup>5</sup>Column 7 is derived by multiplying Columns 1 and 5



itures in this category exhibited marked stability. Table VIII shows that 3.2 per cent of total operating expenditures of small area school boards were allocated to administrative costs in 1957. Again it can be seen that expenditures in this category for this type of authority remained relatively stable, ranging from a high of 3.6 per cent to a low of 2.6 per cent over the period.

The weights used for the Administration Subindex were:

Provincial Administration Subindex	.033
School Unit Administration Subindex	.033
Small Area Administration Subindex	.032

Instructional Supplies and Equipment Subindex weights. These weights had to be calculated from data contained in the Annual Report, 1957-58 of the Department of Education and in the annual financial statements of the school authorities in the sample. Table VI, page 39, Table VII, page 40, and Table VIII, page 41, indicate that the percentage of total operating expenditures devoted to "Instruction" had remained relatively stable over the nine years at all three levels of aggregation. Thus it must be assumed that the proportion devoted to supplies and equipment has also remained relatively constant.



Table X shows that 3.7 per cent, 3.4 per cent and 4.0 per cent of total operating expenditures were devoted to supplies and equipment by school boards in the province as a whole, by School Units, and by small area authorities respectively.

Therefore the weights used for the Instructional Supplies and Equipment Subindex were:

Provincial Instructional Supplies and  
Equipment Subindex .037

School Unit Instructional Supplies and  
Equipment Subindex .034

Small Area Instructional Supplies and  
Equipment Subindex .040

Plant Operation and Maintenance Subindex weights.

The proportion of total operating expenditures devoted to plant operation and maintenance has shown a slight decline throughout the period as shown in Tables VI, VII, and VIII on pages 39, 40 and 41 respectively. In 1957, provincial authorities as a whole allocated 17.4 per cent of total operating expenditures to plant operation and maintenance. During the same period School Units allotted 16.9 per cent and small area authorities 18.3 per cent of total operating expenditures to plant operation and maintenance.



These percentages, expressed as weights for index compilation purposes are:

Provincial Plant Operation and Maintenance  
Subindex .174

School Unit Plant Operation and Maintenance  
Subindex .169

Small Area Plant Operation and Maintenance  
Subindex .183

Conveyance Subindex weights. Table VI shows that throughout the province as a whole, the proportion of total operating costs for conveyance increased from 8.0 per cent in 1957 to 12.9 per cent in 1965. This increase was the result of an increase in the proportion of total operating expenditures for conveyance in the School Unit boards which rose from 11.7 per cent in 1957 to 20.7 per cent in 1965 as shown in Table VII, page 40. Expenditures for conveyance in small areas remained relatively constant during the period as indicated in Table VIII, page 41. Small area authorities allotted 1.5 per cent of total operating expenditures to conveyance in 1957.

On the basis of 1957 percentages, the weightings for the Conveyance Subindexes were:

Provincial Conveyance Subindex .080





School Unit Conveyance Subindex .117

Small Area Conveyance Subindex .015

Fees and Auxiliary Services Subindex weights.

Table VI shows that expenditures for fees and auxiliary services by all provincial school authorities has increased from 1.3 per cent of total operating expenditures in 1957 to 2.8 per cent in 1965. Fees and auxiliary services accounted for 1.4 per cent of total operating expenditures of School Units in 1957 and 2.1 per cent in 1965. Small area school boards devoted 3.8 per cent of total operating expenditures to fees and auxiliary services in 1965 compared to 1.3 per cent in 1957.

Using 1957 as the base year for weighting purposes, the weightings for the Fees and Auxiliary Services Subindexes were:

Provincial Fees and Auxiliary Services  
Subindex .013

School Unit Fees and Auxiliary Services  
Subindex .014

Small Area Fees and Auxiliary Services  
Subindex .013

Summary. The methods employed in determining the weighting patterns for the major subindexes have



been discussed, Table XI summarizes the major subindex weights for each of the three levels of aggregation of school authorities.

#### IV. STAGES 1 AND 2: MAJOR SUBINDEX CONSTRUCTION

This section describes in detail the construction of each of the six major subindexes specified on page 55 in accordance with the steps outlined on pages 56-7.

##### Salary Subindexes

Component weights. Instructional Salary Subindexes II and III were compiled on the assumption that quality of the teaching force was a utility-determining characteristic. Years of training determined by level of certification were taken to be a measure of quality and this necessitated the consideration of each level of certification as a separate component in the compilation of these salary subindexes. This required that a weighting be determined for each component.

The Annual Reports of the Department of Education lists the number of teachers at each level of certification together with the average wage at each level. This permitted the calculation of total salaries paid at each level of certification from which could be obtained the proportion of total salary allocated to each level. Such calculations were performed by



TABLE XI

MAJOR SUBINDEX WEIGHTS FOR PROVINCIAL, SCHOOL  
UNIT, AND SMALL AREA EDUCATION PRICE INDEXES

Subindex	Provincial	School Unit	Small Area
Instructional Salary	.663	.633	.718
Administration	.033	.033	.032
Instructional Supplies and Equipment	.037	.034	.040
Plant Operation and Maintenance	.174	.169	.182
Conveyance	.080	.117	.015
Fees and Auxiliary Services	.013	.014	.013
Totals	1.000	1.000	1.000



multiplying the number of teachers by the average salary at each level of certification. Table XII shows the computed totals and the percentages which were utilized in determining the weights. According to the data contained in Table XII, 20.37 per cent of total salary in the base year 1957 was paid to teachers holding Professional Certificates, 21.95 per cent to teachers holding Standard Certificates and 57.68 per cent to teachers holding less than Standard Certificates. The weights used for the components of Instructional Salary Subindexes II and III are set out in Table XIII.

Table XII shows that there has been a continued increase in the percentage of total salary paid to teachers with higher levels of certification as the series progresses. Since Atherton took this shift into account by splicing his Salary Subindexes II and III at 1962 values, it was decided that two Instructional Salary Subindexes II and III would be developed to test the splicing effect on subindex values. One set of Instructional Salary Subindexes II and III was developed using base year weights while a second set was developed using the splicing technique commencing with 1962 values.

Instructional Salary Subindex I was compiled





TABLE XII

COMPUTED TOTAL SALARY, TOTAL AND PERCENTAGES OF TOTAL SALARY  
PAID BY CERTIFICATION IN SASKATCHEWAN 1957-1965

Year	Computed Total Salary (1)	Professional Certificate		Standard Certificate		Less Than Stand- ard Certificate		Less Than Professional	
		Amount (2)	Per Cent (3)	Amount (4)	Per Cent (5)	Amount (6)	Per Cent (7)	Amount (8)	Per Cent (9)
1957	24,235,757	4,935,771	20.37	5,319,658	21.95	13,980,328	57.68	19,299,986	79.63
1958	29,257,203	6,404,196	21.89	7,577,966	25.90	15,275,041	52.21	22,853,007	78.11
1959	32,647,801	7,357,976	22.53	9,656,023	29.57	15,633,802	47.90	25,289,825	77.47
1960	35,196,766	8,153,626	23.16	11,291,451	32.07	15,751,689	44.77	27,043,140	76.84
1961	38,411,971	9,593,304	24.97	13,141,625	34.21	15,677,042	40.82	28,818,667	75.03
1962	41,862,136	11,054,675	26.41	14,400,990	34.40	15,406,471	39.19	30,807,461	73.59
1963	44,155,300	12,647,286	28.64	16,990,128	38.47	14,517,886	32.89	31,508,014	71.36
1964	47,290,927	14,426,304	30.50	18,557,424	39.24	14,307,199	30.26	32,864,623	69.50
1965	52,749,322	17,312,638	32.82	21,419,808	40.60	14,016,876	26.58	35,436,684	67.18

Source: Province of Saskatchewan, Department of Education, Annual Reports.  
1957-65



TABLE XIII

WEIGHTS ASSIGNED TO COMPONENTS OF  
INSTRUCTIONAL SALARY SUBINDEXES II AND III

Salary Subindex	Component	Weight
II	Professional	.2037
II	Less Than Professional	.7963
III	Professional	.2037
III	Standard	.2195
III	Less Than Standard	.5768



on the assumption that years of training as they relate to the quality of the teaching force were not a utility-determining characteristic and hence there were no components to be weighted.

Price data. The attempt to distinguish between the various levels of quality of the teaching force necessitated the compilation of five sets of price data as follow:

1. The average annual salary for all teachers.
2. The average annual salary for teachers holding Professional Certificates.
3. The average annual salary for teachers holding less than Professional Certificates.
4. The average annual salary for teachers holding Standard Certificates.
5. The average annual salary for teachers holding less than Standard Certificates.

The average annual salary for all teachers for each year of the study was taken directly from the Annual Reports of the Department of Education. Other salary data were compiled by dividing the total salary paid at each level by the number of teachers in each level of certification. Table XIV summarizes the price data for salaries together with the corresponding



price relatives. Table XV sets out the price data for salaries and price relatives based on the base year 1962 which was used to compile the Spliced Instructional Salary Subindexes II and III.

Instructional Salary Subindex I. Instructional Salary Subindex I was compiled on the assumption that years of training as they relate to the quality of the teaching force were not a utility-determining characteristic and hence the subindex values were identical to the price relatives set out in Column 2 of Table XIV. These values were transferred to Table XVI. Column 3, Table XVI, which gives the values for Instructional Salary Subindex I, indicates that the price level of teachers' salaries has increased 68.47 per cent over the nine-year period.

Instructional Salary Subindex II. Instructional Salary Subindex II was compiled on the basis of two levels of utility: teachers with four or more years of professional training and possessing Professional Certificates, and teachers with less than four years of professional training possessing certificates other than Professional. Using 1957 as the base year for weighting purposes, Table XII shows that 20.37 per





TABLE XIV

ANNUAL SALARIES AND PRICE RELATIVES FOR SASKATCHEWAN  
TEACHERS BY CERTIFICATION LEVEL 1957-1965

All Teachers		Less Than Professional			Standard			Less Than Standard		
Year	Price Relative (1)	Salary Relative (2)	Salary (3)	Price Relative (4)	Salary (5)	Price Relative (6)	Salary (7)	Price Relative (8)	Salary (9)	Price Relative (10)
1957	\$3086	100.00	\$4741	100.00	\$2869	100.00	\$3369	100.00	\$2835	100.00
1958	3634	117.75	5703	120.29	2298	118.43	3906	115.93	2968	104.69
1959	3970	128.64	6142	129.55	3599	125.44	4150	123.18	3327	117.35
1960	4153	134.57	6492	136.93	3747	130.60	4330	128.52	3418	120.52
1961	4374	141.73	6718	141.70	3917	136.52	4571	135.67	3495	123.28
1962	4528	146.72	6845	144.37	4010	139.76	4638	137.66	3560	125.57
1963	4660	151.00	7038	148.44	4113	143.36	4696	139.38	3591	126.66
1964	4846	157.03	7264	153.21	4229	147.40	4773	141.67	3648	129.94
1965	5199	168.47	7802	164.56	4470	155.80	5014	148.82	3835	135.27

Source: Province of Saskatchewan, Department of Education, Annual Reports, 1957-65

X Price relatives are obtained by expressing annual salaries for each year as a percentage of annual salaries obtaining in 1957.



TABLE XV

ANNUAL SALARIES AND PRICE RELATIVES FOR SASKATCHEWAN  
TEACHERS BY CERTIFICATE LEVEL, 1962-1965

Year	Professional		Standard		Less Than Standard		Less Than Professional	
	Salary	Price Relative	Salary	Price Relative	Salary	Price Relative	Salary	Price Relative
1962	\$6845	100.00	\$4638	100.00	\$3560	100.00	\$4010	100.00
1963	7038	102.82	4696	101.25	3591	100.87	4113	102.57
1964	7264	106.12	4773	102.91	3684	103.48	4229	105.46
1965	7802	113.98	5014	108.11	3835	107.72	4470	111.47

Source: Province of Saskatchewan, Department of Education,  
Annual Reports, 1962-65.



TABLE XVI  
INSTRUCTIONAL SALARY SUBINDEX I

Year	Price Relative (1)	Subindex Value (2)
1957	100.00	100.00
1958	117.75	117.75
1959	128.64	128.64
1960	134.57	134.57
1961	141.73	141.73
1962	146.73	146.73
1963	151.00	151.00
1964	157.03	157.03
1965	168.47	168.47

Source: Column 2, Table XIV.



cent of teachers held Professional Certificates while 79.63 per cent held less than Professional Certificates. Table XVII shows the details of the construction of Instructional Salary Subindex II. Price relatives for the two components were transferred from Columns 4 and 10 of Table XIV.

Spliced Instructional Salary Subindex II was developed on the basis of price relatives set out in Tables XIV and XV. The details of the construction of this subindex are set out in Table XVIII.

The values for both Instructional Salary Subindexes II are set out in Columns 2 and 3 of Table XXI to facilitate comparison. It is quite evident that changing the weightings for levels of certification to 1962 values and incorporating this into the subindexes by means of the splicing technique has little effect on the subindex values. Therefore Spliced Instructional Salary Subindex II was not used in compiling the overall indexes.

Instructional Salary Subindex II shows that the increase in price level of teachers' salaries was 57.58 per cent over the period 1957-1965.





TABLE XVII

## DETAILS OF CONSTRUCTION OF INSTRUCTIONAL SALARY SUBINDEX II

Year	Level of Certification						Subindex Value (7)
	Professional			Less than Professional			
	Pr. Rel. (1)	Wt. (2)	Pr. Rel. (3)	Pr. Rel. (4)	Wt. (5)	Wtd. Pr. Rel. (6)	
1957	100.00	.2037	20.37	100.00	.7963	79.63	100.00
1958	120.29		24.50	118.43		94.31	118.18
1959	129.55		26.39	125.44		99.89	126.28
1960	136.93		27.89	130.60		104.00	131.89
1961	141.70		28.86	136.52		108.71	137.57
1962	144.37		29.41	139.76		111.29	140.70
1963	148.44		30.24	143.36		114.16	144.40
1964	153.21		31.21	147.40		117.37	148.58
1965	164.56		33.52	155.80		124.06	157.58

Source: Computed from Table XIV, page 77



TABLE XVIII

## DETAILS OF CONSTRUCTION OF SPLICED INSTRUCTIONAL SALARY SUBINDEX II

Year	Level of Certification						Subindex Values (7)	Spliced Subindex (8)
	Professional Price Relative (1)	Professional Weight (2)	Wtd. Pr. Rel. (3)	Less Than Professional Price Relative (4)	Weight (5)	Wtd. Pr. Rel. (6)		
1957	100.00	.2037	20.37	100.00	.7963	79.63	100.00	100.00
1958	120.29		24.50	118.43		94.31	118.81	118.81
1959	129.55		26.39	125.44		99.89	126.28	126.28
1960	130.93		27.89	130.60		104.00	131.89	131.89
1961	141.70		28.86	136.52		108.71	137.57	137.57
1962	144.37		29.41	139.76		111.29	140.70	140.70
	100.00	.2641	26.41	100.00	.7359	73.59	100.00	
1963	102.82		27.15	102.57		75.48	102.63	144.32
1964	106.12		28.03	105.46		77.61	105.64	148.64
1965	113.98		30.10	111.47		82.03	112.13	157.77
$X_{\text{Splicing Ratio}} = \frac{\text{Subindex Value (Base 1957)}}{\text{Subindex Value (Base 1962)}}$								

Source: Computed from Table XIV, page 77 and Table XV, page 78.



Instructional Salary Subindex III. Table XIX contains details of the construction of Instructional Salary Subindex III. Weighting patterns for the three different levels of utility considered were obtained from Table XII while price relatives were taken from Columns 4, 8, and 10 of Table XIV, page 78. Table XIX shows that the price level of teachers' salaries as measured by Instructional Salary Subindex III has increased 44.21 per cent over the nine-year period.

Spliced Instructional Salary Subindex III is set out in Table XX. Price relatives from both Tables XIV and XV were used. Different weighting patterns were introduced in 1962. Table XX shows that the price level of teachers' salaries over the nine-year period increased 44.62 per cent.

In order that both Instructional Salary Subindexes III could be compared, their subindex values were set out in Columns 4 and 5 of Table XXI. An examination of corresponding subindex values for each year of the study revealed that a weighting correction introduced in 1962 by means of the splicing technique had no significant effect on these values. In view of this finding, Spliced Instructional Salary Subindex III was not utilized in the compilation of the overall indexes.



TABLE XIX

## DETAILS OF CONSTRUCTION OF INSTRUCTIONAL SALARY SUBINDEX III

Level of Certification											
Year	Professional					Standard					Subindex Values (10)
	Price Rel. (1)	Weight (2)	P. Rel. (3)	Price Rel. (4)	Wtd. P. Rel. (5)	Wtd. P. Rel. (6)	Less Than Standard				
							Price Rel. (7)	Weight (8)	Wtd. P. Rel. (9)		
1957	100.00	.2037	20.37	100.00	.2195	21.95	100.00	.5768	57.68	100.00	
1958	120.29		24.50	115.93		25.45	104.69		60.39	110.34	
1959	129.55		26.39	123.18		27.04	117.35		67.69	121.12	
1960	136.93		27.89	128.52		28.21	120.52		69.52	125.62	
1961	141.70		28.86	135.67		29.78	123.28		71.11	129.75	
1962	144.37		29.41	137.66		30.22	125.57		72.43	132.06	
1963	148.44		30.24	139.38		30.37	126.66		73.06	133.67	
1964	153.21		31.21	141.67		31.10	129.94		74.95	137.26	
1965	164.56		33.52	148.82		32.67	135.27		78.02	144.21	

Source: Computed from Table XIV, page 77.





TABLE XX

## DETAILS OF CONSTRUCTION OF SPLICED INSTRUCTIONAL SALARY SUBINDEX III

Year	Level of Certification										Spliced Subindex Values (11)
	Professional					Standard					
	Price Rel. (1)	Wt. (2)	Wtd. P.R. (3)	Price Rel. (4)	Wt. (5)	Wtd. P.R. (6)	Price Rel. (7)	Wt. (8)	Wtd. P.R. (9)	Subindex Values (10)	
1957	100.00	.2037	20.37	100.00	.2195	21.95	100.00	.5768	57.68	100.00	100.00
1958	120.29		24.50	115.93		25.45	104.69		60.39	110.34	110.34
1959	129.55		26.39	123.18		27.04	117.35		67.69	121.12	121.12
1960	136.93		27.98	128.52		28.21	120.52		69.52	125.62	125.62
1961	141.70		28.86	135.67		29.78	123.28		71.71	129.75	129.75
1962	144.37		29.41	137.66		30.22	125.57		72.43	132.06	
	100.00	.2641	26.41	100.00	.3440	34.40	100.00	.3919	39.19	100.00	132.00
1963	102.82		27.15	101.25		34.83	100.87		39.53	101.51	134.05
1964	106.12		28.03	102.91		35.40	103.48		40.55	103.98	137.32
1965	113.98		30.10	108.11		37.19	107.72		42.22	109.51	144.62
Splicing Ratio = $\frac{\text{Subindex Value (Base 1957)}}{\text{Subindex Value (Base 1962)}}$											

Source: Computed from Table XIV, page 77 and Table XV, page 78.



TABLE XXI  
THE INSTRUCTIONAL SALARY SUBINDEXES

Year	Subindex I <sup>1</sup> (1)	Subindex II		Subindex III	
		Unspliced <sup>2</sup> (2)	Spliced <sup>3</sup> (3)	Unspliced <sup>4</sup> (4)	Spliced <sup>5</sup> (5)
1957	100.00	100.00	100.00	100.00	100.00
1958	117.75	118.81	118.81	110.34	110.34
1959	128.64	126.28	126.28	121.12	121.12
1960	134.57	131.89	131.89	125.62	125.62
1961	141.73	137.57	137.57	129.75	129.75
1962	146.73	140.70	140.70	132.06	132.06
1963	151.00	144.40	144.32	133.67	134.05
1964	157.03	148.58	148.64	137.26	137.35
1965	168.47	157.58	157.77	144.21	144.62

- <sup>1</sup>Column 2, Table XVI, p. 79  
<sup>2</sup>Column 7, Table XVII, p. 81  
<sup>3</sup>Column 8, Table XVIII, p. 82  
<sup>4</sup>Column 10, Table XIX, p. 84  
<sup>5</sup>Column 11, Table XX, p. 85



Administration Subindex

The category of expenditures designated as "Administration" incorporates expenses incurred in the central office of school authorities. Annual financial statements disclose twenty-two components in this category with provision to add miscellaneous components. Included in the list of components are advertising, conventions, indemnity to local secretaries, rent and utilities, secretaries' salary, other office salaries, telephone and telegraph, unit trustees' indemnity, travel, and supervision, and office supplies.

Component weights. The Annual Report of the Department of Education does not include a breakdown of administrative expenditures. It was therefore necessary to examine the annual financial statements of the school authorities in the sample to determine which components would be selected to represent the goods and services included in this category.

This examination revealed five categories of expenditure for which price data were readily obtainable: advertising, administrative salaries, clerical salaries, office supplies, and utilities. The larger portion of remaining expenditures were allotted to conventions, local secretaries' and



unit trustees' indemnity. These remaining expenditures for administration were combined into another expenditures category.

Table XXII shows the breakdown of expenditures for administration by category together with the corresponding percentage of total expenditure for administration and the component weights.

Price Data. Price data for the components of the Administration Subindex were obtained at the local, provincial and national levels. This procedure was not inconsistent with that employed by other education index makers. Although Atherton obtained the bulk of his data at the local level, he used the Wholesale Price Index for "Fully and Chiefly Manufactured Goods" of the Dominion Bureau of Statistics to measure the movement of price level of the other Expenditures component of his Administration Subindex (1, p. 102).

Wage data for the various occupations within the labor force are not compiled by the Saskatchewan Department of Labour. This necessitated an examination of publications of the Dominion Department of Labour for relevant data. It was discovered that the Wage Rates and Salaries (4) publications contained salary data of various occupations for some of the larger







TABLE XXII

1957 EXPENDITURES ON ADMINISTRATION BY  
SCHOOL UNITS AND SMALL AREA AUTHORITIES

Authority	Advert- ising	Adminis- trative Salaries	Clerical Salaries	Office Supplies	Utilities	Other	Total
School Units	\$31,824	\$202.767	\$ 94,259	\$25,651	\$15,345	\$314,034	\$683,880
Small Areas	1,383	93,095	57,674	1,993	3,120	48,731	205,996
Totals	33,207	295,862	151,933	27,644	18,465	362,765	889,876
Percentage	3.73	33.25	17.07	3.11	2.08	40.76	
Weight	.0373	.3325	.1707	.0311	.0208	.4076	

Source: 1957 Annual Financial Statement of school authorities  
in the sample.



Saskatchewan cities. Various wage series contained in these publications were utilized in computing price relatives for the labor inputs of the Administration Subindex.

The salary series chosen to represent movements in the price level of administrative salaries was that for Senior Clerks in manufacturing industries in Regina. It was impossible to obtain an inter-city average of this salary since price data was lacking for some cities for various years.

The selection of the wage series for Senior Clerks was based on the close correspondence between the job description and the actual duties performed by secretaries. According to the Dominion Department of Labour, a Senior Clerk is one who:

Under little or no supervision, performs advanced and complicated clerical duties requiring the exercise of considerable judgment and independent analysis and a considerable knowledge of departmental or company procedures: performs such types of work as preparing complex reports or maintaining complicated records, co-ordinating reports which require extensive preparation or involved calculations and control functions, and preparing special reports or summaries. May co-ordinate clerical work of a department or establishment (4, 1958, P. 270).

The Saskatchewan School Act sets forth the duties of a secretary-treasurer which includes preparing and transmitting reports and statements to the



Department of Education; keeping a proper record of all monies received and disbursed; closing and balancing the books at the end of each school year; and preparing and forwarding financial reports to the Department of Education at the end of each year (6, pp. 56-7).

The decision not to base the movement of the price level of officials' salaries on a professional accountants' salary series was a result of comments contained in Annual Reports which indicated that officials are continually improving their qualifications and hence are not, for the most part, university trained. The 1958-59 Annual Report had this to say about secretary-treasurers' qualifications:

The unit secretary-treasurers throughout the province have continued to improve their qualifications. At the 1959 annual unit secretary-treasurers' examinations, six candidates qualified for the Class B certificate . . . Through the co-operation of the University of Saskatchewan and the Department of Municipal Affairs, arrangements have been made to provide courses for unit secretaries in local government administration. (5, 1958-59, p.13).

The average weekly salaries of Senior Clerks in manufacturing industries in Regina for the years 1957-1965 inclusive are shown in Column 1, Table XLIX of Appendix B. Corresponding price relatives are set out in Column 2 of the same table.



The Junior Stenographer series of the Dominion Department of Labour for manufacturing industries was used to measure the change in price level of salaries of clerical assistants. The average monthly salaries used in the compilation of the component subindex values were unweighted averages of salaries paid junior stenographers in Saskatoon and Regina. An examination of annual financial statements of the school authorities in the sample indicated close correspondence between actual wages paid clerical help in 1957 and the series value. This examination also revealed that some authorities employed part-time help which would rule out the use of a series for more highly trained personnel.

The job description of a junior stenographer and the actual duties appear to have a high degree of congruence. According to the Department of Labour, a junior stenographer is one who:

Takes and transcribes dictation involving a normal range of vocabulary; types material in prescribed form. May cut stencils for use in duplicating machines (4, 1958, p. 271).

The average weekly salaries of junior stenographers for Regina and Saskatoon, their unweighted average together with corresponding price relatives are set out in Columns 3, 4, 5, and 6 of Table XLIX of Appendix B.







It was decided to follow Atherton's procedure and use the price of 8-1/2 x 11 inch duplicating paper (18 lb. weight) as representative of price movements of office supplies (1, p. 101). Price data for duplicating paper were obtained from the Saskatoon branch of Moyer Division, Vilas Industries. This price data together with corresponding price relatives are set out in Columns 1 and 2 of Table L of Appendix B.

Price data for utilities had to be obtained for the compilation of the Plant Operation and Maintenance Subindex. The resulting price relatives were transferred from Column 10, Table LIV of Appendix D to Column 9 of Table XXIII. A discussion of the compilation of price relatives for this component will be deferred until later (p. 112 ff.).

Price relatives for the advertising components were developed from advertising rates furnished by the Saskatoon Star-Phoenix. It was thought that the competitive advertising rates of this newspaper, published in a central Saskatchewan city, were indicative of advertising rates throughout the province. Price data and corresponding price relatives for the advertising component are set out in Columns 3 and 4 of Table L of Appendix B.

The other expenditures component of the



Administration Subindex does not represent a homogeneous grouping although the major portion consists of honoraria to local school boards and trustees' expenses. In view of this it was decided to use the Implicit Price Index for current government expenditures for goods and services to measure changes in the price level of this component. The price relatives for this series, shifted to base year 1957, are set out in Column 5, Table L of Appendix B.

Subindex Construction. Table XXIII shows the details of the construction of the Administration Subindex. The price relatives were weighted in accordance with weightings shown in Table XXII, page 90, and summed to yield the subindex values in Column 13, Table XXIII.

As indicated in Table XXIII, the price level increase in administrative services was 36.17 per cent over the nine-year period. Administrative salaries have increased 41.79 per cent, clerical salaries 36.38 per cent, office supplies 37.28 per cent, and other expenditures 34.40 per cent. Price level increases of the advertising and utilities components were somewhat smaller at 18.75 per cent and 8.57 per cent respectively.



TABLE XXIII

## DEATILS OF CONSTRUCTION OF THE ADMINISTRATION SUBINDEX

Administrative Salaries <sup>1</sup>		Clerical Salaries <sup>2</sup>		Office Supplies <sup>3</sup>		Advertising <sup>4</sup>		Utilities <sup>5</sup>		Other Expenditures <sup>6</sup>		Subindex	
Weight .3325		.1707		.0311		.0373		.0208		.4076			
Year	P.R.	Wtd. P.R.	P.R.	Wtd. P.R.	P.R.	Wtd. P.R.	P.R.	Wtd. P.R.	P.R.	Wtd. P.R.	P.R.		
1957	100.00	33.25	100.00	17.07	100.00	3.11	100.00	3.73	100.00	2.08	100.00	40.76	100.00
1958	102.60	34.11	102.17	17.44	100.00	3.11	100.00	3.73	103.46	2.15	104.00	42.39	102.93
1959	103.32	34.35	112.08	19.13	133.89	4.16	100.00	3.73	105.78	2.20	107.40	43.78	107.35
1960	109.94	36.56	117.08	19.99	137.28	4.27	100.00	3.73	107.82	2.24	112.00	45.65	112.44
1961	126.33	42.00	122.83	20.97	137.28	4.27	100.00	3.73	108.09	2.25	116.70	47.57	120.79
1962	135.79	45.15	124.98	21.33	137.28	4.27	100.00	3.73	107.65	2.24	120.50	49.12	125.84
1963	138.21	45.95	127.66	21.79	137.28	4.27	118.75	4.43	107.89	2.24	125.10	50.99	129.67
1964	139.47	46.37	132.91	22.69	137.28	4.27	118.75	4.43	108.11	2.25	129.40	52.74	132.75
1965	141.79	47.15	136.38	23.28	137.28	4.27	118.75	4.43	108.57	2.26	134.40	54.78	136.17

<sup>1</sup>Column 2, Table XXIII, p. 93<sup>2</sup>Column 6, Table XXIII, p. 93<sup>3</sup>Column 2, Table XXIV, p. 95<sup>4</sup>Column 4, Table XXIV, p. 95<sup>5</sup>Column 10, Table XXXIV<sup>6</sup>Column 6, Table XXIV, p. 95





### Instructional Supplies Subindex

The Annual Reports of the Department of Education do not provide a breakdown of expenditures in this category. An examination of the 1957 annual financial statements of school authorities revealed that expenditures in this category could be broken down into four components: books, school supplies, sports equipment, and other expenditures. The other expenditures category included such miscellaneous items as correspondence courses, scholarships, piano tuning, leadership course, bursaries and institutes.

Component weights. Component weights were derived on the basis of expenditure data obtained from the school authorities in the sample. Table XXIV provides the details of weight determination for the four components which make up the Instructional Supplies and Equipment Subindex.

Price data. Price data for books were obtained from the Saskatchewan Book Bureau, Department of Education. To develop the book component subindex, it was necessary to create a "market basket" of books. This "market basket" consisted of selected library and reference books only since text book purchases were negligible in 1957. Two library titles in each





TABLE XXIV

WEIGHTING DATA FOR THE COMPONENTS OF THE INSTRUCTIONAL  
SUPPLIES AND EQUIPMENT SUBINDEX

Authority	Books	School Supplies	Sports Equipment	Other Expend- itures	Total
School Units	\$160,816	\$372,445	\$44,513	\$71,503	\$649,277
Small Areas	42,248	154,273	27,384	58,215	283,120
Totals	204,064	526,718	71,897	129,718	932,397
Percentage	21.89	56.49	7.71	13.91	100.00
Weights	.2189	.5649	.0771	.1391	1.00

Source: Annual financial statements of school authorities  
in the sample



of Divisions I, II, III, and IV were selected together with an atlas and a dictionary to represent reference books. The prices of these ten books were summed for each of the years and the average price was then used to represent the changes in price level of this component. Details of the development of the "market basket" of books together with the price relatives are set out in Table LI of Appendix C.

The compilation of a component subindex for the school supplies component posed a problem because of the wide variety of goods which could be included. In view of this, it was decided to approach the Saskatoon branch of Moyer Division, Vilas Industries, for assistance. This firm is one of the major suppliers of school supplies and equipment and hence was in a position not only to categorize school supplies but to determine weightings for these categories.

Company sales were broken down into five categories: furniture, chalkboard, maps and globes, machines, and general supplies. The proportion of total sales for each category was determined and two items were selected in each category to represent the movement of the price level. The items were then priced for each year and price relatives determined on the basis of these data. Data received from Moyer



Division, Vilas Industries is contained in Appendix C. Table LII of Appendix C contains details of the construction of the supplies component of the School Supplies Component Subindex.

Although price data for sports equipment were available, local sporting goods dealers were unable to give weightings to the various goods which would have to be considered as components in such a subindex. Consequently, it was decided to use the Sports Equipment Subindex of the Consumer Price Index compiled by the Dominion Bureau of Statistics to measure price level movements of this component. The price relatives taken from this subindex are set out in Column 5 of Table XXV.

The General Wholesale Price Index for "Fully and Chiefly Manufactured Goods" was used to measure the change in price level of the Other Expenditures component. These price relatives were based on 1935-39 prices and had to be shifted to the base year 1957. The details of this shift of base year together with the new price relatives are given in Columns 5 and 6 of Table LIII, Appendix D.

Subindex construction. Table XXV gives the details of construction of the Instructional Supplies and Equipment Subindex from the price relatives of



the component subindexes. The price relative of each component subindex was weighted in accordance with weighting patterns set out in Table XXIV. The weighted price relatives were then summed for each year to yield a subindex value.

Table XXV shows that the price level increase in instructional supplies was 16.33 per cent over the period. Largest price level increases were experienced by books, 23.04 per cent and school supplies, 16.80 per cent. The price level of sports equipment rose by only 5.60 per cent while that of other expenditures rose by 9.83 per cent.

#### Plant Operation and Maintenance Subindex

An examination of annual financial statements revealed that components included in this category of expenditure included utilities, insurance, janitors' salaries, janitors' supplies, rent, repairs to buildings and equipment, taxes, telephones, and truck expenses.

Component weights. Annual Reports of the Department of Education do not provide a breakdown of expenditures for plant operation and maintenance. Hence it was necessary to select the components for the subindex after an examination of expenditure





TABLE XXV

## DETAILS OF CONSTRUCTION OF THE INSTRUCTIONAL SUPPLIES AND EQUIPMENT SUBINDEX

Weight	1		2		3		4		Subindex
	Books		School Supplies		Sports Equipment		Other Expenditures		
	.2189		.5649		.0771		.1391		
Year	P.R. (1)	Wtd. P.R. (2)	P.R. (3)	Wtd. P.R. (4)	P.R. (5)	Wtd. P.R. (6)	P.R. (7)	Wtd. P.R. (8)	(9)
1957	100.00	21.89	100.00	56.49	100.00	7.71	100.00	13.91	100.00
1958	102.73	22.49	100.10	56.55	100.10	7.72	100.16	13.93	100.69
1959	103.51	22.66	109.70	61.97	100.00	7.71	101.55	14.13	106.47
1960	105.85	23.17	110.70	62.53	100.70	7.76	101.80	14.16	107.62
1961	108.20	23.68	111.20	62.82	99.70	7.69	102.77	14.30	108.49
1962	113.67	24.88	111.90	63.21	101.20	7.80	104.66	14.56	110.45
1963	119.14	26.08	112.30	63.44	104.90	8.09	106.85	14.86	112.47
1964	120.31	26.34	116.70	65.92	106.00	8.17	107.77	14.99	115.42
1965	123.04	26.93	116.80	65.98	105.60	8.14	109.83	15.28	116.33

<sup>1</sup>Table XXVII<sup>2</sup>Table XXVIII<sup>3</sup>Column 2, Table XXIX



patterns of the school authorities in the sample. This examination revealed five major components: janitors' salaries, janitors' supplies, utilities, fire insurance, and repairs. A sixth component, other expenditures, was added to accomodate miscellaneous expenditures.

Component weights had to be obtained from expenditure data contained in the annual financial statements of the school authorities in the sample. Table XXVI contains expenditure data of these authorities by component, percentage of total expenditures, and corresponding weightings.

Price data. The Wage Rates and Salaries publication of the Dominion Department of Labour contains a wage series for labourers in municipal government service. It was decided to use this series to measure the change in price level of the janitors' salary component. The average hourly salary paid to janitors in Moose Jaw, Prince Albert, Regina, and Saskatoon were averaged to obtain values for index compilation purposes. The hourly wages derived by this method for each year of the study and the corresponding price relatives are set out in Columns 1 and 2 respectively of Table LIII of Appendix D.



TABLE XXVI

DETAILS OF WEIGHT DETERMINATION FOR COMPONENTS  
OF THE PLANT OPERATION AND MAINTENANCE SUBINDEX

Author- ity	Janitors' Salaries	Janitors' Supplies	Utilities	Fire In- surance	Repairs	Other Ex- penditures	Totals
School Units	\$ 860,361	\$108,006	\$ 906,399	\$ 84,474	\$1,079,681	\$217,277	\$3,256,198
Small Areas	516,823	55,276	256,617	33,696	509,896	90,671	1,464,979
Totals	1,377,184	163,282	1,165,016	118,170	1,589,577	307,948	4,721,177
Percent- ages	29.19	3.46	24.67	2.49	33.67	6.52	100.00
Weights	.2919	.0346	.2467	.0249	.3367	.0652	1.00

Source: Compiled from 1957 annual financial statements of school authorities in the sample



In his attempt to determine appropriate price data for janitors' supplies, Atherton stated:

. . . the prices of caretakers' supplies are quoted on a national basis, the costs of transportation being averaged across the nation. For this reason it was decided that price data at the national level would be representative of prices paid by Alberta school authorities for cleaning supplies (1, p. 113).

Atherton selected the Industrial Selling Price Index of the "Soaps, Washing Compounds and Cleaning Preparations Industry" compiled by the Dominion Bureau of Statistics as the most appropriate price data. These same data were also used to measure the movement of prices for janitors' supplies in this study. Since the base year of this index is 1956, it was necessary to shift the base to 1957. Details of this base year shift are shown in Columns 3 and 4 of Table LIII of Appendix D.

Considerable difficulty was encountered in developing the utilities component. School units did not differentiate between expenditures for light, water, and heat. However, the annual financial statements of three small area authorities, Saskatoon Collegiate Board, Saskatoon Public School District, and Regina Institute Board showed a breakdown of expenditures for utilities. Weighting was achieved on this basis and the details are set out in Table XXVII.







TABLE XXVII

DETAILS OF WEIGHT DETERMINATION FOR UTILITIES COMPONENT  
OF PLANT OPERATION AND MAINTENANCE SUBINDEX

Authority	Light	Fuel	Water	Total
Saskatoon Collegiate	\$ 5,822.41	\$ 4,188.63	\$ 1,057.00	\$11,068.04
Saskatoon Public	30,840.56	30,648.57	8,205.59	69,694.72
Regina Collegiate	8,891.15	14,800.91	2,426.57	26,118.63
Totals	45,554.12	49,638.11	11,689.16	106,881.39
Percentages	42.62	46.44	10.94	100.00
Weights	.4262	.4644	.1094	1.00

Source: 1957 Annual financial statements.



As was previously mentioned, price data for electricity and natural gas were not available at the provincial level. The price level movement of these two goods were measured using the Fuel and Electricity components of the Canada Consumer Price Index. These price relatives were calculated on the base year 1949 and hence had to be shifted to the base year of 1957. Details are set out in Table LIV of Appendix D. Price data for the water component of the Utilities Component Subindex were obtained from the Light and Water Department, City of Saskatoon. The rates for 325,000 cubic feet of water were used to measure the movement of the price level of this component. These data are given in Column 7, Table LIV of Appendix D. Details of construction of the Utilities Component Subindex are provided in Table LIV of Appendix D.

Price data of fire insurance rates to schools were unobtainable from the Saskatchewan Government Insurance Office. An examination of the Canada Consumer Price Index revealed a Personal Property Insurance Index. It was decided to utilize this index to measure the average movement of prices for school fire insurance. Price relatives for this component obtained from the Prices Division, Dominion



Bureau of Statistics, are set out in Column 7, Table LV of Appendix D.

Expenditures for repairs to buildings and equipment were not broken down into labor and material. In order to arrive at weightings for these two goods and services, estimates were obtained from local contractors. These contractors generally agreed that labor be weighted at .67 and materials at .33 for this type of work.

Because of the great variation in types of materials utilized in repair work, it was decided to follow the example set by the Alberta Education Price Indexes and use a composite materials index. The Non-Residential Building Materials Price Index of the Dominion Bureau of Statistics was selected as the source of price data. The price relatives for this index are calculated on 1949 as the base year and thus had to be shifted to the base year 1957. Details are set out in Columns 1 and 2 of Table LV of Appendix D.

Price data for labor were derived by taking an average of the average hourly wage paid carpenters in the cities of Saskatoon, Regina, Moose Jaw, and Prince Albert. These wage series are contained in the Wage Rates and Salaries publications of the Dominion Department of Labour. The average hourly wage thus



calculated for each year together with the corresponding price relatives are set out in Columns 4 and 5 of Table LV of Appendix D. The compilation of a price relative for the repairs component is also set out in Table LV of Appendix D.

The General Wholesale Index for "Fully and Chiefly Manufactured Goods" of the Dominion Bureau of Statistics was used to measure the movement of the price level of the Other Expenditures component. Since the base year of this index is 1935-39, it was necessary to shift it to the base year 1957. These data are set out in Columns 5 and 6 of Table LIII of Appendix D.

Subindex construction. Table XXVIII gives the details of the construction of the Plant Operation and Maintenance Subindex from the price relatives of the component subindexes. Price relatives of the component subindexes were weighted in accordance with the weighting pattern determined in Table XXVI. The weighted price relatives were then summed for each year to yield subindex values.

According to Table XXVIII, the price level of plant operation has increased by 20.48 per cent over the period of the study. Largest price level increases were experienced by janitors' salaries, 30.07 per cent;





TABLE XXVIII

## DETAILS OF CONSTRUCTION OF THE PLANT OPERATION AND MAINTENANCE SUBINDEX

Janitors' Salaries		Janitors' Supplies		Utilities		Fire Insurance		Repairs		Other Expenditures		Sub-index	
Weight	.2919	.0346	.2467	.0249	.3367	.0652							
Year	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	P.R.	
1957	100.00	29.19	100.00	3.46	100.00	24.67	100.00	2.49	100.00	33.67	100.00	6.52	100.00
1958	103.75	30.28	102.78	3.56	103.46	25.52	102.90	2.56	102.28	34.43	100.16	6.53	102.88
1959	107.51	31.38	106.90	3.70	105.78	26.10	108.00	2.69	105.09	35.38	101.55	6.62	105.87
1960	107.51	31.38	108.82	3.77	107.82	26.60	114.70	2.86	106.91	36.00	101.80	6.64	107.25
1961	112.03	32.70	109.11	3.78	108.09	26.67	116.40	2.90	106.96	36.01	102.77	6.70	108.76
1962	118.04	34.46	109.02	3.77	107.65	26.56	117.90	2.94	108.81	36.64	104.66	6.82	111.19
1963	120.30	35.12	109.30	3.78	107.89	26.62	121.20	3.02	111.96	37.70	106.85	6.97	113.21
1964	126.31	36.87	110.26	3.81	108.11	26.67	128.50	3.20	114.77	38.64	107.77	7.03	116.22
1965	130.07	37.97	112.76	3.90	108.57	26.68	136.10	3.39	122.59	41.28	109.83	7.16	120.48

1,2,6Table XXXII

3Table XXXIV

4Appendix D

5Table XXXV



fire insurance, 36.10 per cent; and repairs, 22.59 per cent. The price level of the remaining components experienced less increase with that of janitors' supplies up 12.76 per cent, utilities up 8.57 per cent, and other expenditures up 9.83 per cent.

### Conveyance Subindex

Annual Reports of the Department of Education do not provide a breakdown of expenditures for conveyance. The 1957 annual financial statements of school authorities provided for four categories of expenditures for conveyance: drivers' salaries, bus expense, contract bus routes, and other conveyance. More recent annual financial statements provide a breakdown of conveyance expenditures into drivers' salaries, mechanics' salaries, gas and oil, repairs, garage operation, licences, insurance, and contracted services.

Component weights. Weights for this subindex of the Alberta Education Price Indexes were obtained from the Alberta School Bus Operators' Association. Such an organization does not exist in Saskatchewan. Although yearly data on the proportion of unit-owned and contracted buses in Saskatchewan are not provided, the 1960-61 Annual Report of the Department of Education states:



The unit boards owned approximately 1,288 vehicles, and contracted with private owners for 464 buses and panels during the period of this report (5, 1960-1, p. 11).

This indicates that approximately 75 per cent of the school buses were unit-owned which justified obtaining available weighting data from School Units.

Component weighting for this subindex was determined on the basis of 1968 expenditure data provided by Mr. M. Pickering, Unit Manager, Assiniboia School Unit No. 5 and Mr. P. A. Okerstrom, Secretary-Treasurer, Lloydminster School Unit No. 60. Assiniboia School Unit operated fifty-five bus routes with sixty buses plus thirty bombadiers for winter emergencies. Lloydminster School Unit operated fifty-one bus routes with fifty-five buses. It was felt that because of the size of the two bus fleets, the expenditure patterns of these two School Units for conveyance would be representative of all School Unit expenditures for this component.

Data received from the two School Units permitted a breakdown of expenditures for conveyance into seven major categories: drivers' wages, mechanics' wages, gas and oil, repairs, tires, licences, and insurance. Lloydminster School Unit showed an item for miscellaneous expenditures, but the amount involved was so small that it was combined with expenditures





for repairs. The percentage of total expenditure for each category was obtained by summing expenditures of the two authorities for each of the categories and expressing the totals as percentages of the total expenditures of the two authorities. The details of component weight determination for the Conveyance Subindex are set out in Table XXIX.

Price data. Securing price data at the provincial level for some of the components of the Conveyance Subindex proved impossible. Mr. O. J. Kennedy, Division Manager, Consumer Marketing, Gulf Oil of Canada Ltd. advised that gasoline price data for school buses were not readily available and that it would take many hundreds of man-hours to try and develop it.<sup>1</sup> The Treasury Department, Taxation Branch, of the Province of Saskatchewan advised that they do not maintain a record in summary form in respect of the cost of registering school buses which includes each of the years in the present study.<sup>2</sup> In view of this, it was decided to enlist the assistance of the Prices Division, Dominion Bureau of Statistics. Data from this source were secured in the form of price relatives for the components of the Saskatoon and Regina Automobile Operation Index. These price

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<sup>1,2</sup>Personal letters to the writer.





TABLE XXIX

## DETAILS OF COMPONENT WEIGHT DETERMINATION FOR CONVEYANCE SUBINDEX

Unit	Drivers' Wages	Mechanics' Wages	Gas, Oil	Repairs	Tires	Licen-ces	Insur-ance	Miscel-laneous	Totals
Lloydminster	\$107,191	\$19,213	\$ 50,039	\$37,756	\$ 7,689	\$ 5,477	\$2,259	\$1,569	\$231,193
Assiniboia	94,367	15,339	51,637	57,998	7,027	5,722	2,361		234,451
Totals	201,558	34,552	101,676	95,754	14,716	11,199	4,620		465,644
Percentages	43.29	7.42	21.84	20.89	3.16	2.41	.99		100.00
Weights	.4329	.0742	.2184	.2089	.0316	.0241	.0099		1.00

Source: Appendix E

xCombined with Repairs.



relatives for each component for the two cities were averaged in order to obtain what might be referred to as provincial values. Price relatives for the repairs component were determined by taking the unweighted average of five components: lubrication, fender replacement, brake lining, muffler replacement, and battery. Details are set forth in Table LVI of Appendix E.

The position of school bus driver is a part-time one, requiring no training nor special skills. In view of this, it was considered appropriate to use the wage series for Labourers- Municipal Government Services contained in the Wage Rates and Salaries publication of the Dominion Department of Labour to measure price level movements in this category. This series was used previously to measure movements in the price level of the janitors' salary component of the Plant Operation and Maintenance Subindex.

Movements in the price level of mechanics' salaries were measured by price relatives developed from the average wage rate per hour for automobile mechanics contained in the Urban and Suburban Transportation Wage Series of the Dominion Department of Labour. It must again be emphasized that while this series may not represent actual wages paid to



mechanics employed by school boards, the fact that there is mobility within the labor force should make changes in the series representative of increases received in the mechanic trade. Price relatives for this component were derived from the average of hourly wages paid mechanics in urban and suburban transportation systems in the cities of Moose Jaw, Saskatoon, and Regina. Details are set out in Table LVII of Appendix E.

Subindex Construction. Details of the construction of the Conveyance Subindex are contained in Table XXX. The price relatives of the component subindexes were weighted according to weighting data developed in Table XXIX, page 114. The weighted price relatives were summed for each year to give subindex values. The overall price level increase of conveyance was 16.59 per cent for the nine-year period. The price level increase in drivers' wages amounted to 27.36 per cent while that of mechanics' wages amounted to 36.21 per cent. Smaller price level increases were shown for repairs, up 9.60 per cent; tires, up 17.95 per cent; and licences, up 7.50 per cent. A decrease in the price level of gas and oil of 2.95 per cent and a decrease of 6.50 per cent in the price level of insurance were observed.



TABLE XXX  
DETAILS OF CONSTRUCTION OF CONVEYANCE SUBINDEX

Year	Bus Drivers, <sup>1</sup> Wages			Mechanics, <sup>2</sup> Wages			Gas and Oil <sup>3</sup>			Repairs <sup>4</sup>			Tires <sup>5</sup>			Licences <sup>6</sup>			Insurance <sup>7</sup>			Subindex Value (15)
	P.R. (1)	P.R. (2)	Wtd. (2)	P.R. (3)	P.R. (4)	Wtd. (4)	P.R. (5)	P.R. (6)	Wtd. (6)	P.R. (7)	P.R. (8)	Wtd. (8)	P.R. (9)	P.R. (10)	Wtd. (10)	P.R. (11)	P.R. (12)	Wtd. (12)	P.R. (13)	P.R. (14)	Wtd. (14)	
Weight	.4329			.0742			.2184			.2089			.0316			.0241			.0099			
1957	100.00	43.29		100.00	7.42		100.00	21.84		100.00	20.89		100.00	3.16		100.00	2.41		100.00			100.00
1958	103.48	44.80		108.05	8.02		100.90	22.04		101.24	21.15		99.80	3.15		100.00	2.41		109.70			102.66
1959	106.96	46.30		116.09	8.61		100.40	21.93		103.36	21.59		101.95	3.22		100.00	2.41		115.60			105.20
1960	109.45	47.38		117.82	8.74		99.80	21.80		106.52	22.25		105.90	3.35		100.00	2.41		105.60			106.98
1961	109.95	47.60		117.82	8.74		97.45	21.28		107.72	22.50		110.05	3.48		100.00	2.41		95.90			106.96
1962	112.43	48.67		123.56	9.17		98.90	21.60		110.42	23.07		108.90	3.44		100.00	2.41		93.50			109.29
1963	115.92	50.18		128.16	9.51		98.75	21.57		109.58	22.89		110.50	3.49		100.60	2.42		88.70			110.94
1964	118.40	51.26		131.03	9.72		97.95	21.39		108.62	22.67		112.80	3.56		101.60	2.45		86.30			111.90
1965	127.36	55.13		136.21	10.11		97.05	21.20		109.60	22.90		117.95	3.73		107.50	2.59		93.50			116.59

<sup>1</sup>Column 2, Table XXXII  
<sup>2</sup>Table XXXIX  
3,4,5,6,7Appendix E





Fees and Auxiliary Services Subindex

These two categories of expenditures were combined because individually they represented a very small proportion of total expenditures for educational inputs. Expenditures for fees represent tuition fees paid by one school authority for the education of students in another school authority. Auxiliary services include expenditures for field days, Christmas concerts, and high school allowances. The latter category of expenditure has decreased with the increased proportion of students being conveyed to school by bus.

In order to measure movements in the price level of this subindex, it was decided to use the Implicit Price Index for current government expenditures. Details are set out in Table XXXI.

Data contained in Table XXXI indicate that the price level increase of fees and auxiliary services amounted to 34.40 per cent over a nine-year period 1957-1965.



TABLE XXXI

DETERMINATION OF PRICE RELATIVES FOR FEES  
AND AUXILIARY SERVICES SUBINDEX

Year	Implicit Price Index (1949=100)	Implicit Price Index (1957=100)
1957	151.4	100.00
1958	157.4	104.00
1959	162.6	107.40
1960	169.5	112.00
1961	176.6	116.70
1962	182.1	120.50
1963	189.1	125.10
1964	195.9	129.40
1965	203.1	134.40

Source: Dominion Bureau of Statistics, National Accounts Income and Expenditure, 1957-1965



## V. STAGES 3 AND 4. FINAL INDEX CONSTRUCTION

Stage 3

Stage 3 of the construction of the Saskatchewan Education Price Indexes consisted of combining the major subindexes, other than the Instructional Salary Subindexes, into three subindexes as follows:

A Provincial Subindex for Other Inputs

A School Unit Subindex for Other Inputs

A Small Area Subindex for Other Inputs

Each of the subindexes developed in the previous section was weighted in accordance with the weights set out in Table XI, page 72. The weighted price relatives thus derived were summed for each year, and the sums expressed as price relatives to yield subindex values.

Provincial Other Inputs Subindex. Table XXXII provides details of the construction of the Provincial Other Inputs Subindex. This table indicates a price level increase of 21.16 per cent in overall educational inputs other than teaching services during the nine-year period. The annual rate of price level increase of 2.35 per cent was spread fairly evenly over the period.



School Unit Other Inputs Subindex. Table XXXIII illustrates construction of the School Unit Other Inputs Subindex. The price level increase in educational inputs other than teaching services for this type of school authority amounted to 20.79 per cent over the nine-year period. This amounted to an average annual increase of 2.33 per cent, again spread evenly over the period.

Small Area Other Inputs Subindex. Table XXXIV provides the details of the construction of the Small Area Other Inputs Subindex. It indicates a 21.99 per cent increase in the price level of inputs other than teaching services for this type of school authority. The average yearly price level increase amounted to 2.44 per cent spread fairly evenly over the period.

Comments on stage 3. The three subindexes for all inputs excepting teaching services were compiled for the purpose of facilitating construction of the final overall indexes. The minute difference in price level movement resulted from the different weighting patterns used and not from differences in the price level of the various components.





TABLE XXXII

## DETAILS OF CONSTRUCTION OF PROVINCIAL OTHER INPUTS SUBINDEX

Year	Adminis- tration		Instructional Supplies and Equipment		Plant Operation		Conveyance		Fees and Auxiliary Services		Sum of Wtd. P.R. (11)	Subindex (12)
	P.R. (1)	Wtd. P.R. (2)	P.R. (3)	Wtd. P.R. (4)	P.R. (5)	Wtd. P.R. (6)	P.R. (7)	Wtd. P.R. (8)	P.R. (9)	Wtd. P.R. (10)		
Weight		.033		.037		.174		.080		.013		
1957	100.00	3.30	100.00	3.70	100.00	17.40	100.00	8.00	100.00	1.30	33.70	100.00
1958	102.93	3.40	100.69	3.73	102.88	17.90	102.66	8.21	104.00	1.35	34.59	102.64
1959	107.35	3.54	106.47	3.94	105.87	18.42	105.20	8.42	107.40	1.40	35.72	105.99
1960	112.44	3.71	107.62	3.98	107.25	18.66	106.98	8.56	112.00	1.46	36.37	107.92
1961	120.79	3.99	108.49	4.01	108.76	18.92	106.96	8.56	116.70	1.52	37.00	109.79
1962	125.84	4.15	110.45	4.09	111.19	19.35	109.29	8.74	120.50	1.57	37.90	112.46
1963	129.67	4.28	112.47	4.16	113.21	19.70	110.94	8.88	125.10	1.63	38.65	114.69
1964	132.75	4.38	115.42	4.27	116.22	20.22	111.90	8.95	129.40	1.68	39.50	117.21
1965	136.17	4.49	116.33	4.30	120.48	20.96	116.59	9.33	134.40	1.75	40.83	121.16



TABLE XXXIII

## DETAILS OF CONSTRUCTION OF SCHOOL UNIT OTHER INPUTS SUBINDEX

Year	Adminis- tration				Instructional Supplies and Equipment				Plant Operation				Conveyance				Fees and Auxiliary Services				Sum of	
	P.R. (1)	P.R. (2)	Wtd. P.R. (2)	P.R. (3)	Wtd. P.R. (4)	P.R. (5)	Wtd. P.R. (6)	P.R. (7)	Wtd. P.R. (8)	P.R. (9)	Wtd. P.R. (10)	P.R. (11)	Wtd. P.R. (11)	P.R. (12)	Wtd. P.R. (12)	Subindex (12)						
Weight	.033	.034	.169	.080	.014																	
1957	100.00	3.30	100.00	3.40	100.00	16.90	100.00	11.70	100.00	1.40	36.70	100.00										
1958	102.93	3.40	100.69	3.42	102.88	17.39	102.66	12.01	104.00	1.46	37.68	102.67										
1959	107.35	3.54	106.47	3.62	105.87	17.89	105.20	12.31	107.40	1.50	38.86	105.89										
1960	112.44	3.71	107.62	3.66	107.25	18.13	106.98	12.52	112.00	1.57	39.59	107.87										
1961	120.79	3.99	108.49	3.69	108.76	18.38	106.96	12.51	116.70	1.63	40.20	109.54										
1962	125.84	4.15	110.45	3.76	111.19	18.79	109.29	12.79	120.50	1.69	41.18	112.21										
1963	129.67	4.28	112.47	3.82	113.21	19.13	110.94	12.98	125.10	1.75	41.96	114.33										
1964	132.75	4.38	115.42	3.92	116.22	19.64	111.90	13.09	129.40	1.81	42.84	116.73										
1965	136.17	4.49	116.33	3.96	120.48	20.36	116.59	13.64	134.40	1.88	44.33	120.79										



TABLE XXXIV

## DETAILS OF CONSTRUCTION OF SMALL AREA OTHER INPUTS SUBINDEX

Weight	.032			.040			.182			.015			.013			Sum of		
	Adminis- tration			Instructional Supplies and Equipment			Plant Operation			Conveyance			Fees and Auxiliary Services			Wtd. P.R. Subindex		
	P.R. (1)	P.R. (2)	P.R. (3)	P.R. (4)	P.R. (5)	P.R. (6)	P.R. (7)	P.R. (8)	P.R. (9)	P.R. (10)	P.R. (11)	P.R. (12)	P.R. (13)	P.R. (14)	P.R. (15)	P.R. (16)	P.R. (17)	P.R. (18)
1957	100.00	3.20	100.00	4.00	100.00	18.20	100.00	1.50	100.00	1.30	28.20	100.00						
1958	102.93	3.29	100.69	4.03	102.88	18.72	102.66	1.54	104.00	1.35	28.93	102.59						
1959	107.35	3.44	106.47	4.26	105.87	19.27	105.20	1.58	107.40	1.40	29.95	106.21						
1960	112.44	3.60	107.62	4.30	107.25	19.52	106.98	1.60	112.00	1.46	30.48	108.09						
1961	120.79	3.87	108.49	4.34	108.76	19.79	106.96	1.60	116.70	1.52	31.12	110.35						
1962	125.84	4.03	110.45	4.42	111.19	20.24	109.29	1.64	120.50	1.57	31.90	113.12						
1963	129.67	4.15	112.47	4.50	113.21	20.60	110.94	1.66	125.10	1.37	32.28	114.47						
1964	132.75	4.25	115.42	4.62	116.22	21.15	111.90	1.68	129.40	1.68	33.38	118.37						
1965	136.17	4.36	116.33	4.65	120.48	21.93	116.59	1.75	134.40	1.75	34.44	121.99						



Stage 4

Stage 4 represents the final stage in the compilation of the Saskatchewan Education Price Indexes. Each of the three Other Inputs Subindexes was combined with each of the three Salary Subindexes to yield three overall indexes for the province as a whole, for School Units, and for small area authorities. The method of compilation was identical in all cases. The weighted Other Inputs Subindex values were added to the appropriate Instructional Salaries Subindex values to provide three different index numbers for each year for each of the three levels of aggregation.

Provincial Education Price Indexes. The construction of the Provincial Education Price Indexes is shown in Table XXXV. Column 8 of Table XXXV shows that if years of training as they relate to the quality of the teaching force is not considered a utility-determining characteristic, the price level of educational inputs has increased 52.53 per cent over the nine-year period of the study. Column 9, Table XXXV shows that if it is assumed there are two levels of utility in teaching services, the increase in price level of educational inputs was 45.01 per cent over the same period. Where three levels of utility in the teaching force is assumed, the price level







increase is reduced to 36.44 per cent.

School Unit Education Price Indexes. The details of construction of the School Unit Education Price Indexes are set out in Table XXXVI. When it was assumed there is no relationship between years of professional training and quality in the teaching force, the price level of educational inputs showed an increase of 50.97 per cent over the nine-year period as indicated in Column 8 of Table XXXVI. Column 9, Table XXXVI shows that the price level of educational inputs has increased by 44.08 per cent when two levels of utility in the teaching force was assumed. As indicated in Column 10, Table XXXVI, the price level increase was 35.61 per cent over the nine-year period when it was assumed there were three levels of utility within the teaching force.

Small Area Education Price Indexes. Table XXXVII provides details of the construction of the Small Area Education Price Indexes. Column 8, Table XXXVII shows a price level increase of 55.40 per cent over the nine-year period when it was assumed there is no relationship between years of professional training and the quality of the teaching force. When it was assumed there are two levels of utility in the



teaching force, Column 9, Table XXXVII shows a price level increase in educational inputs of 47.58 per cent. When three levels of utility in the teaching force were assumed, the corresponding price level increase amounted to 37.98 per cent over the nine-year period.

Comments on stage 4. The Saskatchewan Education Price Indexes as developed in this chapter will be discussed in further detail in Chapter V.



TABLE XXXV

## DETAILS OF CONSTRUCTION OF PROVINCIAL EDUCATION PRICE INDEXES

Year	Other Inputs (1)	Salary Subindexes (Weight .663)									Index I (8)	Index II (9)	Index III (10)
		I			II			III					
		Subindex (2)	Wtd. (3)	Subindex (4)	Wtd. (5)	Subindex (6)	Wtd. (7)						
1957	33.70	100.00	66.30	100.00	66.30	100.00	66.30	100.00	66.30	100.00	100.00	100.00	100.00
1958	34.59	117.75	78.07	118.81	78.77	110.34	73.16	112.66	113.36	113.36	107.75	107.75	
1959	35.37	128.64	85.29	126.28	83.72	121.12	80.30	120.66	119.09	119.09	115.67	115.67	
1960	36.37	134.57	89.22	131.89	87.44	125.62	83.29	125.59	123.81	123.81	119.66	119.66	
1961	37.00	141.73	93.97	137.57	91.21	129.75	86.02	130.97	128.21	128.21	123.02	123.02	
1962	37.90	146.73	97.28	140.70	93.28	132.06	87.56	135.18	131.18	131.18	125.46	125.46	
1963	38.65	151.00	100.11	144.40	95.74	133.67	88.62	138.76	134.39	134.39	127.27	127.27	
1964	39.50	157.03	104.11	148.58	98.51	137.26	91.00	143.61	138.01	138.01	130.50	130.50	
1965	40.83	168.47	111.70	157.58	104.48	144.21	95.61	152.53	145.31	145.31	136.44	136.44	



TABLE XXXVI

## DETAILS OF CONSTRUCTION OF SCHOOL UNIT EDUCATION PRICE INDEX

Year	Other Inputs (1)	Salary Subindexes (Weight .633)						Index I (8)	Index II (9)	Index III (10)
		Subindex (2)	Wtd. (3)	Subindex (4)	Wtd. (5)	Subindex (6)	Wtd. (7)			
1957	36.70	100.00	63.30	100.00	63.30	100.00	63.30	100.00	100.00	100.00
1958	37.68	117.75	74.54	118.81	75.21	110.34	69.85	112.22	112.89	107.53
1959	38.86	128.64	81.83	126.28	79.94	121.12	76.67	120.69	118.80	115.53
1960	39.59	134.57	85.18	131.89	83.49	125.62	79.52	124.77	123.08	119.11
1961	40.20	141.73	89.72	137.57	87.08	129.75	82.13	129.92	127.28	122.33
1962	41.18	146.73	92.88	140.70	89.06	132.06	83.59	134.06	130.24	124.77
1963	41.96	151.00	95.58	144.40	91.41	133.67	84.61	137.54	133.37	126.57
1964	42.84	157.03	99.40	148.58	94.05	137.26	86.89	142.24	136.89	129.73
1965	44.33	168.47	106.64	157.58	99.75	144.21	91.28	150.97	144.08	135.61





TABLE XXXVII

## DETAILS OF CONSTRUCTION OF SMALL AREA EDUCATION PRICE INDEX

Year	Other Inputs (1)	Salary Subindexes (Weight .718)					Index I (8)	Index II (9)	Index III (10)
		Subindex (2)	Wtd. (3)	Subindex (4)	Wtd. (5)	Subindex (6)	Wtd. (7)		
1957	28.20	100.00	71.80	100.00	71.80	100.00	71.80	100.00	100.00
1958	28.93	117.75	84.54	118.81	85.31	110.34	79.22	113.47	108.15
1959	29.95	128.64	92.36	126.28	90.67	121.12	86.96	122.31	116.91
1960	30.48	134.57	96.62	131.89	94.70	125.62	90.20	127.10	120.68
1961	31.12	141.73	101.76	137.57	98.78	129.75	93.16	132.88	124.28
1962	31.90	146.73	105.35	140.70	101.02	132.06	94.82	137.25	126.72
1963	32.28	151.00	108.42	144.40	103.68	133.67	95.98	140.70	128.26
1964	33.38	157.03	112.75	148.58	106.68	137.26	98.55	146.13	131.93
1965	34.44	168.47	120.96	157.58	113.14	144.21	103.54	155.40	137.98



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## CHAPTER V

### DISCUSSION OF THE SASKATCHEWAN EDUCATION PRICE INDEXES

#### I. INTRODUCTION

This chapter deals with the results of the compilation of the Saskatchewan Education Price Indexes. The three sets of price indexes will first be compared to assess the differential effects on School Units and small area authorities. The effect of the assumptions regarding the quality of the teaching force as measured by level of certification on the price level of teachers' salaries will be discussed. The effect of these same assumptions on the overall price indexes will also be dealt with. Saskatchewan Education Price Index I will be compared to Alberta Education Price Index I and to other well-known price level indicators in the economy. The final section illustrates one application of the Saskatchewan Education Price Indexes.

#### II. DIFFERENTIAL EFFECTS ON SCHOOL UNITS AND SMALL AREA AUTHORITIES

Table XXXVIII gives the average annual rates of price level increase for provincial, School Unit, and small area authorities. The average annual



rate of price level increase of educational inputs of School Units was slightly below that of the province. However the average annual rate of price level increase for small area authorities was slightly higher than the provincial average.

Between the province as a whole and School Units, the differences in the average annual rates of price level increase were .18, .13, and .09 points for Indexes I, II, and III respectively. Between province and small area authorities the differences were .32, .26 and .17 in the three indexes. The difference in the average annual rate of price level increase between School Units and small area authorities was greatest in Indexes I, being .50 points. This difference decreased with Indexes II and III, being .39 and .26 points respectively.

This observed difference in average annual rate of price level increase of educational inputs in the three levels of aggregation was the result of different weighting patterns utilized rather than a difference in price levels of goods and services in the three levels of aggregation. Since small area authorities spend a larger proportion of total expenditures on teachers' salaries, it may be said





TABLE XXXVIII  
AVERAGE ANNUAL RATE OF PRICE LEVEL INCREASE FOR  
PROVINCIAL, SCHOOL UNIT, AND SMALL AREA AUTHORITIES

Authority	Average annual increase in Percentage points					
	Index I (1)	Index II (2)	Index III (3)	Differ- ence I & II (4)	Differ- ence I & III (5)	Differ- ence II & III (6)
Province	5.84	5.03	4.05	-.81	-1.79	-.98
School Unit	5.66	4.90	3.96	-.76	-1.70	-.94
Small Area	6.16	5.29	4.22	-.87	-1.94	-1.07



that price level movements of this component of expenditure has a greater impact on this type of school authority than others.

### III. THE INSTRUCTIONAL SALARY SUBINDEXES

Table XXXIX indicates that there are marked differences in the three Instructional Salary Subindexes. This indicates that making various assumptions about years of professional training as it relates to the quality of the teaching force has a significant effect on the magnitude of price level increases of instructional salaries.

#### Effect of Quality Assumptions on the Instructional Salary Subindex

Column 1, Table XXXIX shows that when it was assumed there is no relationship between years of training and the quality of teaching services, the increase in price level of teachers' salaries amounted to 68.47 per cent over the nine-year period. The average annual rate of price level increase of teachers' salaries was 7.61 per cent.

Column 2 of Table XXXIX shows a price level increase of 57.58 per cent over the nine-year period when it was assumed there are two utility levels in



teaching services. This amounts to an average annual price level increase of 6.40 per cent.

When it was assumed there are three levels of utility for teaching services, Column 3, Table XXXIX indicates a price level increase of 44.21 per cent over the period of the study. The average annual price level increase was 4.91 per cent.

Rates of price level increase in the three Instructional Salary Subindexes were not even throughout the period. Greatest rates of increase in all three Subindexes occurred in the years 1958, 1959, and 1965.

When the average annual rates of price level increase of the three Instructional Salary Subindexes were compared, the effect of the quality assumptions became more pronounced. The assumption of two levels of utility dampened the average annual rate of price level increase by 1.21 percentage points per year. The effect of assuming three levels of utility was even greater. This assumption dampened the rate of average annual increase by 2.70 percentage points per year. The effect of considering three levels of utility rather than two tended to dampen the average annual rate of price level increase by approximately 1.5 points per year.



TABLE XXXIX  
EFFECTS OF QUALITY ASSUMPTIONS ON INSTRUCTIONAL SALARY SUBINDEX VALUES

Year	Salary Subindex I (1)	Salary Subindex II (2)	Salary Subindex III (3)	Differences		
				I & II (4)	I & III (5)	II & III (6)
1957	100.00	100.00	100.00			
1958	117.75	118.81	110.34	+ 1.06	- 7.41	- 8.47
1959	128.64	126.28	121.12	- 2.36	- 7.52	- 5.16
1960	134.57	131.89	125.62	- 2.68	- 8.95	- 6.27
1961	141.73	137.57	129.75	- 4.16	-11.98	- 7.82
1962	146.73	140.70	132.06	- 6.03	-14.67	- 8.64
1963	151.00	144.40	133.67	- 7.40	-17.33	-10.73
1964	157.03	148.58	137.26	- 8.45	-19.77	-11.32
1965	168.47	157.58	144.21	-10.89	-24.26	-13.37





As indicated in Columns 4, 5, and 6 of Table XXXIX, differences between the three Instructional Salary Subindex values in any one year were substantial and increased greatly as the series progressed. This was due to the fact that teachers' qualifications have improved throughout the series causing them to move from one level of certification to a higher one.

#### IV. QUALITY ASSUMPTIONS AND THE OVERALL INDEXES

The significant effect of various assumptions about the quality of the teaching force on the Instructional Salary Subindexes was reflected in the overall indexes. Table XL provides details of the differences in the three Provincial Education Price Indexes. The greatest difference occurred between yearly values of Indexes I and III, reaching 16 points in the final year of the series. The assumption that there are three levels of utility within the teaching force had a tremendous dampening effect on the price level increase of educational inputs. This effect held true to a lesser extent when two utility levels were assumed. The effect of the assumption that there are two utility levels within the teaching force was to dampen the increase in price level



to about half the extent of the dampening effect of three levels of utility.

In terms of average annual increase in price level of educational inputs, Columns 4 and 5 of Table XXXVIII, page 134, show a difference of approximately one percentage point between Provincial Indexes I and II values and a difference of almost two percentage points between Provincial Indexes I and III values.

Tables XLI and XLII show that the effect of assumptions about the quality of the teaching force in the case of School Units and small area authorities was similar to that observed in the Provincial Indexes.

Columns 4, 5 and 6 of Table XXXVIII, page 134, indicate the magnitude of the dampening caused by the quality assumptions on the average annual price level increase within the School Unit and Small Area Indexes. This was almost identical to that at the provincial level.

#### V. A COMPARISON OF THE SASKATCHEWAN AND ALBERTA EDUCATION PRICE INDEXES

The comparison of the Saskatchewan and Alberta Education Price Indexes will be accomplished in three phases as follows:

1. A comparison of the Other Inputs Subindexes.



TABLE XL

EFFECTS OF QUALITY ASSUMPTIONS ON PROVINCIAL EDUCATION PRICE INDEX VALUES

Year	Index I (1)	Index II (2)	Index III (3)	Differences		
				I & II (4)	I & III (5)	II & III (6)
1957	100.00	100.00	100.00			
1958	112.66	113.36	107.75	+ .70	- 4.91	-5.61
1959	120.66	119.09	115.67	-1.57	- 4.99	-3.42
1960	125.59	123.81	119.66	-1.78	- 5.93	-4.15
1961	130.97	128.21	123.02	-2.76	- 7.95	-5.19
1962	135.18	131.18	125.46	-4.00	- 9.72	-5.72
1963	138.76	134.39	127.27	-4.37	-11.49	-7.12
1964	143.61	138.01	130.50	-5.60	-13.11	-7.51
1965	152.53	145.31	136.44	-7.22	-16.09	-8.87



TABLE XLI

EFFECTS OF QUALITY ASSUMPTIONS ON SCHOOL UNIT EDUCATION PRICE INDEX VALUES

Year	Index I (1)	Index II (2)	Index III (3)	Differences		
				I & II (4)	I & III (5)	II & III (6)
1957	100.00	100.00	100.00			
1958	112.22	112.89	107.53	+ .69	- 4.69	-5.36
1959	120.69	118.80	115.53	-1.89	- 5.16	-3.27
1960	124.77	123.08	119.11	-1.69	- 5.66	-3.97
1961	129.92	127.28	122.33	-2.64	- 7.59	-4.95
1962	134.06	130.24	124.77	-3.82	- 9.29	-5.47
1963	137.54	133.37	126.57	-4.17	-10.97	-6.80
1964	142.24	136.89	129.73	-5.35	-12.51	-7.16
1965	150.97	144.08	135.61	-6.89	-15.36	-8.47





TABLE XLII

EFFECTS OF QUALITY ASSUMPTIONS ON SMALL AREA EDUCATION PRICE INDEX VALUES

Year	Index I (1)	Index II (2)	Index III (3)	Differences		
				I & II (4)	I & III (5)	II & III (6)
1957	100.00	100.00	100.00			
1958	113.47	114.24	108.15	+ .77	- 5.32	-6.09
1959	122.31	120.62	116.91	-1.69	- 5.40	-3.71
1960	127.10	125.18	120.68	-1.92	- 6.42	-4.50
1961	132.88	129.90	124.28	-2.98	- 8.60	-5.62
1962	137.25	132.92	126.72	-4.33	-10.53	-6.20
1963	140.70	135.96	128.26	-4.74	-12.44	-7.70
1964	146.13	140.06	131.93	-6.07	-14.20	-8.13
1965	155.40	147.58	137.98	-7.82	-17.42	-9.60



2. A comparison of the Instructional Salary Subindexes I.

3. A comparison of the Provincial Education Price Indexes I.

### The Other Inputs Subindexes

Table XLIII provides details of the differences in subindex values of the Saskatchewan Other Inputs Subindex and the Alberta Other Inputs Subindex. The greatest difference of 2.35 percentage points occurred in the 1958 values. Over the nine-year period of the two studies, the average annual difference in yearly subindex values amounted to 1.10 percentage points. The use of a single Other Inputs Subindex for both Price Indexes would result in an average error of less than .50 percentage points.

That the two subindexes for other inputs are almost identical is not too surprising although price data were collected at two different levels of aggregation. Atherton used data collected, for the most part, at the local and provincial levels of aggregation whereas in this study much reliance had to be placed on price data collected at the national level of aggregation. The majority of inputs, other than labor, which make up the Other Inputs Subindexes are produced at the national level and are subject to



TABLE XLIII

A COMPARISON OF THE OTHER INPUTS SUBINDEXES  
OF THE SASKATCHEWAN AND ALBERTA EDUCATION  
PRICE INDEXES I

Year	Saskatchewan <sup>1</sup>	Alberta <sup>2</sup>	Absolute Difference
1957	100.00	100.00	
1958	102.64	100.28	2.36
1959	105.99	106.23	.24
1960	107.92	109.99	2.07
1961	109.79	111.35	1.56
1962	112.46	112.33	.13
1963	114.69	115.22	.53
1964	117.21	119.09	1.88
1965	121.16	122.31	1.15

<sup>1</sup>Column 12, Table XLII, p. 131

<sup>2</sup>P.J.Atherton, "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." (Unpublished Ph.D. thesis, University of Alberta, 1968) p. 129



mass marketing techniques. Price level increases of the labor components of this subindex are subject to regional and national influences and are not restricted within political boundaries. The growing tendency of labor to become affiliated with national labor unions results in similar percentage wage increases in neighboring provinces. Hence, the close correspondence of the Saskatchewan and Alberta Other Inputs Subindex values is to be expected.

#### The Instructional Salary Subindexes

Table XLIV gives a comparison of the values of Saskatchewan and Alberta Instructional Salary Subindexes I. Columns 1 and 3 of this table indicate that there is no correspondence between yearly sub-index values. Columns 2 and 4 of Table XLIV set out the percentage increases in salary over the previous year for Saskatchewan and Alberta respectively. Except for the years 1958 and 1965 when Saskatchewan teachers received substantial salary increases, the average annual increase in salary over the previous year tended to be less than that received by Alberta teachers. This trend is readily observed when the base year of both Subindexes is shifted to 1958. Columns 5 and 6 set out Saskatchewan and Alberta





TABLE XLIV

## A COMPARISON OF THE SASKATCHEWAN AND ALBERTA EDUCATION SALARY SUBINDEXES I

Year	Sask. Subindex I <sup>1</sup> (1)	Percentage Increase Over Previous Year (2)	Alta. Subindex I <sup>2</sup> (3)	Percentage Increase Over Previous Year (4)	Sask. Subindex I (1958 base) (5)	Alta. Subindex I (1958 base) (6)
1957	100.00		100.00		84.93	90.42
1958	117.75	17.75	110.59	11.59	100.00	100.00
1959	128.64	9.25	121.14	9.54	109.25	109.54
1960	134.57	4.61	130.70	7.89	114.28	118.18
1961	141.73	5.32	140.48	7.48	120.37	127.03
1962	146.73	3.53	146.24	4.10	124.46	132.24
1963	151.00	3.91	149.88	2.49	128.24	135.53
1964	157.03	3.99	155.70	3.88	133.36	140.79
1965	168.47	7.29	160.06	2.80	143.07	144.73



Instructional Salary Subindex values shifted to base year 1958.

### The Education Price Indexes

Table XLV provides a comparison of the Saskatchewan and Alberta Education Price Indexes I. That there is not a close correspondence between yearly values of the two Educational Price Indexes indicates the necessity of compiling price indexes for education on a provincial basis.

## VI. THE SASKATCHEWAN EDUCATION PRICE INDEXES AND OTHER INDICATORS OF PRICE LEVEL

Table XLVI shows Provincial Index I and three major price level indicators: the Saskatoon-Regina Consumer Price Index, the Implicit Price Index for current government expenditures on goods and services, and the Wholesale Price Index.

A comparison of these indexes revealed that the commonly-used price level indicators are not a suitable measure of the price level movement of educational inputs. While the average annual rate of price level increase of goods and services represented by the Consumer Price Index amounted to 1.22 per cent over the period, the rate of increase in price level of educational inputs amounted to 5.84 per



TABLE XLV

A COMPARISON OF THE SASKATCHEWAN AND  
ALBERTA EDUCATION PRICE INDEXES I

Year	Saskatchewan <sup>1</sup>	Alberta <sup>2</sup>
1957	100.00	100.00
1958	112.66	106.62
1959	120.66	115.40
1960	125.59	122.70
1961	130.97	129.26
1962	135.18	133.18
1963	138.76	136.53
1964	143.61	141.60
1965	152.53	145.52

<sup>1</sup>Table XXXV, p. 137<sup>2</sup>P.J.Atherton, "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." (Unpublished Ph.D. thesis, University of Alberta, 1968) p. 134.



TABLE XLVI

## THE SASKATCHEWAN EDUCATION PRICE INDEX AND COMMONLY-USED INDICATORS OF PRICE LEVEL

Year	Saskatchewan Education Price Index 1	Consumer 2 Price Index (Saskatoon-Regina)	Implicit 3 Price Index	Wholesale Price Index
1957	100.00	100.00 <sup>x</sup>	100.0 <sup>x</sup>	100.0 <sup>x</sup>
1958	112.66	102.43	104.0	100.1
1959	120.66	103.35	107.4	101.5
1960	125.59	104.45	112.0	101.8
1961	130.97	105.28	116.7	102.7
1962	135.18	107.05	120.5	104.6
1963	138.76	107.89	125.1	106.8
1964	143.61	108.98	129.4	107.7
1965	152.53	110.99	134.4	109.8

<sup>1</sup>Table XLII<sup>2,4</sup>Government of Canada, Dominion Bureau of Statistics, Prices and Price Indexes, 1957-1965.<sup>3</sup>National Accounts Income and Expenditures, 1957-1965<sup>x</sup> Bases shifted to 1957





cent. To the extent that the Consumer Price Index can be interpreted as a cost of living index, it may be said that while it cost 10.99 per cent more in 1965 to maintain the 1957 standard of living, it cost 52.53 per cent more to provide the 1957 standard of education.

While the Implicit Price Index increased at a fairly even average annual rate of 3.82 per cent, the Education Price Index increased at an annual rate of 5.84 per cent. The average annual rate of increase of the latter index was not even, there being large variations from year to year.

The Wholesale Price Index showed an increase in price level of 9.8 per cent over the period compared to an increase of 52.53 per cent in the Education Price Index.

The above comparisons of the Saskatchewan Education Price Index with other indicators of price level movement points up the need for the development of special Education Price Indexes.

## VII. REAL EXPENDITURES FOR EDUCATION

Although this study was primarily concerned with the development of a set of price indexes for educational inputs in Saskatchewan, it was thought



appropriate to illustrate one application of these price indexes.

There are occasions when interest centers on period to period changes in the purchasing power represented by the amounts of money expended. As a case in point, educators may wish to determine whether or not annual per weighted pupil expenditures have kept pace with price level changes. When this situation arises, expenditure data in current dollars are inadequate. Such data must be adjusted for price level changes and the adjusted data are said to be in terms of constant or real dollars. Price indexes are used to effect this adjustment.

Wasserman (6, p. 106), has expressed the relationship between current and real dollars in the form of a ratio:

$$\frac{\text{Real expenditures in year X}}{\text{Index value in base year}} = \frac{\text{Current expenditures in year X}}{\text{Index value in year X}}$$

It must be pointed out that constant-dollar figures must be regarded as approximations because of the imprecision of price indexes due to the methodology used in compiling the index. Wasserman states:

Limitations in the price indexes are carried over into constant-dollar data derived by use of the indexes. Consequently, individual period-to-period fluctuations of one or two per cent in constant-dollar data seldom would have any significance, and in particular cases even changes



of several per cent would be well within the margin of error inherent in the data (6,p.109).

For the purpose of the present analysis, the Saskatchewan Education Price Indexes were used to convert current per weighted pupil expenditures for each year of the series into 1957 or constant dollars. The constant-dollar figures obtained in this present analysis are 1957 dollars because the Saskatchewan Education Price Indexes used to adjust the per weighted pupil expenditures has 1957 as the base year. Wasserman, in commenting on the proper interpretation of any statistical series expressed in constant dollars states:

If some other base period had been used in these subindexes, the yearly subindex values would differ and a different set of constant-dollar data would have been obtained. However the relative--e.g. per cent -- period-to-period changes in the subindexes and in the "constant dollar" data would not have been affected by the choice of base period (6, p. 107).

The data obtained in the present analysis permitted the comparison of annual per weighted pupil expenditures in constant dollars to determine whether or not current expenditures per weighted pupil have kept pace with price level changes.

#### Weighted Pupil Data

It is possible to control for increasing student enrollments by dividing total current operating





expenditures by the total number of pupils enrolled. However, such a procedure may be inaccurate for two reasons. First, secondary teachers normally receive a higher average salary than elementary teachers. Secondly, class enrollments in secondary grades tend to be somewhat lower than in the elementary grades. The net result is an increase in the cost of educating secondary pupils over elementary pupils.

This fact is recognized by the grant structures of many state and provincial governments. The pre-1962 foundation program in New York State weighted Grades 7-12 pupils at 1.25 (6, p. 96). In Saskatchewan, the higher cost of educating high school students is recognized in the grant structure which provides for an operating grant of \$4.50 per day per teacher for elementary schools and \$6.00 per day per high school teacher in schools of less than fifteen classrooms (2, p. 117). On this basis, the Saskatchewan grant per high school teacher is approximately 1.3 times that of an elementary teacher.

It was decided to use this ratio of 1.3:1 as the basis for weighting students in Grades 9-12 for the purpose of obtaining weighted pupil enrollments for each of the years under study. The decision to use this ratio was based on the assumption that the





TABLE XLVII

## DETAILS OF COMPUTATION OF EXPENDITURES PER WEIGHTED PUPIL

Year	Enrollment			(1) + (3) (4)	Operating <sup>3</sup> Expenditures (5)	Expenditure per Weighted Pupil (6)
	Elementary <sup>1</sup> (1)	Secondary <sup>2</sup> (2)	Wtd. Secondary (3)			
1957	147,732	33,707	43,819	191,551	\$40,602,684	\$212
1958	151,132	35,603	46,414	197,546	46,057,871	233
1959	155,869	37,955	49,342	205,211	50,841,617	248
1960	160,842	39,844	51,797	212,639	55,981,403	263
1961	164,724	42,848	55,701	220,425	60,598,526	275
1962	166,804	47,123	61,260	228,064	64,966,315	285
1963	167,810	51,748	67,272	234,082	70,143,616	298
1964	169,794	55,260	71,838	241,632	77,245,021	320
1965	173,077	57,796	75,135	248,212	87,752,260	354

<sup>1,2,3</sup>Province of Saskatchewan, Department of Education, Annual Reports 1957-65.



cost of educating secondary school pupils was 1.3 times that of educating elementary school pupils in all Saskatchewan schools. Other ratios could have been used but these probably would not have been any more or less accurate since cost analyses of elementary and secondary education have not been undertaken. Table XLVII provides details of the determination of total weighted pupil enrollments and current per weighted pupil expenditures for each of the years 1957-1965 inclusive.

#### Real Expenditures per Weighted Pupil

Table XLVIII sets out real expenditures per weighted pupil based on the deflation of current expenditures using Saskatchewan Provincial Education Price Indexes I and III. These two indexes were used expressly to point up the effect that assumptions regarding the quality of the teaching force have on the estimation of real expenditures per weighted pupil.

When Provincial Education Price Index I was used as a deflator, per weighted pupil expenditures in constant dollars rose from \$212 in 1957 to \$232 in 1965, an increase of 9 per cent. During the same period, current per weighted pupil expenditures increased from \$212 to \$354, an increase of 67 per cent. Thus, although current expenditures per weighted pupil increased by \$142



TABLE XLVIII

## EXPENDITURE PER WEIGHTED PUPIL IN CONSTANT DOLLARS

Year	Expenditure per Wtd. Pupil (Current Dollars) (1)	Price Index I (2)	Expenditure per Wtd. Pupil (Constant Dollars) (3)	Percentage Change over Previous Year (4)	Price Index III (5)	Expenditure per Wtd. Pupil (Constant Dollars) (6)	Percentage Change over Previous Year (7)
1957	\$212	100.00	\$212		100.00	\$212	
1958	233	112.66	207	-2.4	107.75	216	+1.9
1959	248	120.66	206	-0.5	115.67	214	-0.9
1960	263	125.59	209	+1.5	119.66	220	+2.8
1961	275	130.97	210	+0.5	123.02	224	+1.8
1962	285	135.18	211	+0.5	125.46	227	+1.3
1963	298	138.76	215	+1.9	127.27	234	+3.1
1964	320	143.61	223	+3.7	130.50	245	+4.7
1965	354	152.53	232	+4.0	136.44	259	+5.7
Increase	67%		9%			22%	



from 1957 to 1965, all but \$20, or 86 per cent was taken up by increases in the price level. During the period 1958 to 1962 per pupil expenditures in constant dollars were slightly below the 1957 level, but surpassed this level in 1963, 1964 and 1965.

The use of Provincial Education Price Index III as a deflator of current expenditures per weighted pupil resulted in an increase in per weighted pupil expenditures in constant dollars from \$212 in 1957 to \$259 in 1965. This represents an increase of 22 per cent. In this case, of the \$142 increase in current expenditures per weighted pupil from 1957 to 1965, all but \$47, or 67 per cent was taken up by increases in the price level.

## VII. SUMMARY AND CONCLUSIONS

The compilation and analysis of the Saskatchewan Education Price Indexes makes possible the following general conclusions:

(1) The price level of educational inputs in Saskatchewan increased during the period at an average annual rate of 5.84 per cent.

(2) The assumptions relating to different levels of quality in the teaching force tended to dampen the rate of price level increase. Where two levels of utility were assumed, the average annual rate of increase decreased by approximately one per cent.







Where three levels of utility were assumed, the average annual rate of price level increase slowed down by approximately two per cent.

(3) The rate of price level increase had a greater effect on small area authorities than on School Units because of the higher weighting for teachers' salaries in the Small Area Education Price Indexes.

(4) There is some indication that price data for inputs other than teachers' salaries might be collected at the national level of aggregation without the occurrence of a gross error.

(5) The lack of correspondence between the Saskatchewan and Alberta Instructional Salary Subindexes points up the necessity of compiling individual Salary Subindexes for each province and hence separate provincial Education Price Indexes.

(6) Other commonly-used price indexes are not appropriate for the measurement of price level movements in education.

(7) About 86 per cent of the increase in current expenditures per weighted pupil from 1957 to 1965 have been taken up by increases in price levels.



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## CHAPTER VI

### SUMMARY, CONCLUSIONS AND IMPLICATIONS

#### I. SUMMARY OF THE PROBLEM

Inflation, which can be defined as increases in general price levels, has become an important factor in our economy since the end of World War II. Although there are price indexes to measure the movement of prices in many sectors of our economy, little if any attention has been devoted to the measurement of price level movements of educational inputs.

It was the purpose of this study to compile a set of Education Price Indexes for Saskatchewan. Because of the different patterns of expenditures observable in School Units and small area authorities, it was deemed feasible to compile three separate sets of price indexes, one for each of the following: the province as a whole, School Units, and small area authorities. Three different assumptions, relating to quality of the teaching force determined by level of certification as a utility-determining characteristic, necessitated the compilation of three different indexes for each of the three levels of aggregation for a total of nine separate indexes.



## II. SUMMARY OF ASSUMPTIONS

The Saskatchewan Education Price Indexes were compiled on the basis of two major and several minor assumptions. These are summarized below.

### Major Assumptions

1. It was assumed that the rates of price increase for goods and services affected all school boards equally (p.58 supra).

2. It was assumed that there has been no change in the quality of inputs of goods and services other than teaching services and that increases in prices are due to inflationary pressures (p.58 supra).

### Minor Assumptions

1. The Instructional Salary Subindexes were compiled on the basis of two assumptions: that quality of teaching services was a utility-determining characteristic and that quality of teaching services was not a utility-determining characteristic (p.58 supra).

2. Where weightings were not available from Annual Reports of the Department of Education, it was assumed that the weightings derived from data in the sample were representative of all school authorities.

3. It was assumed that the wage series for





Senior Clerks in manufacturing industries in Regina was representative of wages received by secretary-treasurers of school authorities (p.91, supra).

4. It was assumed that the average of the hourly wages of Junior Stenographers in manufacturing industries in Saskatoon and Regina was representative of the wages received by clerical help employed by school authorities (p.93 supra).

5. It was assumed that advertising rates furnished by the Saskatoon Star-Phoenix were representative of advertising rates throughout Saskatchewan (p.94 supra).

6. It was assumed that the price of duplicating paper represented price level changes in office supplies (p.94 supra).

7. It was assumed that the Implicit Price Index measured changes in price levels of the Other Expenditures Component Subindex of the Administration (p.95 supra) Subindex and also of the Fees and Auxiliary Services Subindex (p.118 supra).

8. It was assumed that weighting and price data provided by Moyer Division, Vilas Industries, for the Instructional Supplies and Equipment Subindex were representative of actual weightings and prices (p.99 supra).

9. It was assumed that price level movements



of the "market basket" of books represented the actual movement of price levels of all reference and library books purchased by school authorities (p.97 supra).

10. It was assumed that the General Wholesale Price Index for "Fully and Chiefly Manufactured Goods" was representative of price level changes of the Other Inputs Component of the Instructional Supplies and Equipment Subindex (p.100 supra) and Plant Operation and Maintenance Subindex p.109 supra).

11. It was assumed that the Sports Equipment Subindex of the Consumer Price Index represented price level changes of sports equipment purchased by school authorities (p.100 supra).

12. It was assumed that the Dominion Department of Labour wage series for Labourers in Municipal Government Service was representative of wages received by school janitors (p.103 supra) and school bus drivers (p.115 supra).

13. It was assumed that the Industrial Selling Price Index of the "Soaps, Washing Compounds and Cleaning Preparations Industry" was representative of the price level changes of janitors' supplies (p.103 supra).

14. It was assumed that the Fuel and Electricity



Components of the Canada Consumer Price Index represented price level changes of these two components of the Plant Operation and Maintenance Subindex (p.107 supra).

15. It was assumed that water rates in effect in the City of Saskatoon were representative of water rates to schools throughout the province (p.107 supra).

16. It was assumed that the Personal Property Insurance Index of the Canada Consumer Price Index represented price level movements of school fire insurance (p.107 supra).

17. It was assumed that the average of the wage series for carpenters in Regina, Moose Jaw, Saskatoon and Prince Albert represented wages received by school repairmen (p.108 supra).

18. It was assumed that the Non-Residential Building Materials Index of the Dominion Bureau of Statistics measured price level changes of repair material utilized by school authorities (p.108 supra).

19. It was assumed that mechanics' wages contained in the Urban and Suburban Transportation Wage Series of the Dominion Department of Labour were representative of wages received by mechanics employed by school authorities (p.115 supra).

20. It was assumed that price relatives for



components of the Saskatoon and Regina Automobile Operation Index were representative of price level changes of identical components for school buses (p.113 supra).

### III. SUMMARY OF RESEARCH PROCEDURES

The nature of the study necessitated the compilation of three sets of price indexes designated:

Provincial Education Price Indexes

School Unit Education Price Indexes

Small Area Education Price Indexes

The method of compilation was identical in each case. Each price index was compiled from six major subindexes. The five non-instructional salary subindexes were combined into an Other Inputs Subindex in order to facilitate compilation of the final indexes.

Weighting data for the major subindexes were obtained from Annual Reports of the Department of Education and in the case of the Instructional Salary Subindexes and the Instructional Supplies and Equipment Subindex from expenditure data of forty-two School Units and ten small area authorities.

Weighting data for the component subindexes were obtained from the expenditure data of the school authorities sample mentioned above.







Price relatives were derived from the prices of forty-one commodities and seven different types of labour inputs.

Price data for teaching services were obtained from Annual Reports of the Department of Education. Price data for labor inputs other than teaching services were obtained from the Wage Rates and Salaries publications of the Dominion Department of Labour. Price data for commodities were obtained for the most part at the provincial level and from published series of the Dominion Bureau of Statistics.

#### Instructional Salary Subindexes

Three different salary subindexes were compiled on the basis of two different assumptions about the quality of teaching services as it relates to years of professional training. It must be reiterated at this point that there is no conclusive evidence that quality of teaching services is a utility-determining characteristic. The purpose was to determine the effect these various assumptions would have on the movement of educational price levels.

Assumption 1. Instructional Salary Subindex I was developed on the assumption that years of professional training as they relate to the quality



of the teaching force were not a utility-determining characteristic. Hence any increase in salary was deemed to be inflationary.

Assumption 2. Instruction Salary Subindexes II and III were compiled on the assumption that quality of the teaching force was a utility-determining characteristic. Two levels of utility were considered in the compilation of Subindex II: teachers with four or more years of professional training and possessing Professional Certificates and teachers with less than four years of training and holding certificates other than Professional. Instructional Salary Subindex III was compiled on the assumption that there are three levels of utility within the teaching force: teachers with four or more years of professional training and possessing Professional Certificates, teachers with two but less than four years of training and holding Standard Certificates, and teachers with less than two years of training and possessing other certificates.

### III. THE FINDINGS

As a result of the compilation of the Saskatchewan Education Price Indexes, it may be stated that inflation has had a marked impact on the price level



of educational inputs. In general, the price level of educational inputs has risen 52.53 per cent over the nine-year period 1957-1965.

Because of different expenditure patterns, which in turn affected the weighting patterns of the major subindexes, inflation had a more severe impact on small area authorities than on the School Units.

The assumption that quality of the teaching force as reflected by years of professional training was a utility-determining characteristic tended to substantially dampen the rate of increase in price level within each Index.

A comparison of the Saskatchewan Education Price Indexes with commonly-used price level indicators in the economy showed that special education price indexes are necessary to measure the impact of inflation on educational inputs.

#### IV. RECOMMENDATIONS FOR FURTHER RESEARCH

This study was based on the model developed by Atherton for a similar study undertaken for Alberta. Since it appears special price indexes are necessary to measure the movement of the price level of educational inputs, similar indexes could be



developed for other provinces.

Since this study was conducted at a high level of aggregation, similar studies for individual School Units and small area authorities could be undertaken in order to ascertain whether or not the price indexes developed here are applicable to individual school authorities.





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APPENDIX A

SAMPLE OF SCHOOL AUTHORITIES USED FOR  
COMPONENT SUBINDEX WEIGHTING



SAMPLE OF SCHOOL AUTHORITIES USED FOR  
COMPONENT SUBINDEX WEIGHTING

Small Area School Authorities

Lloydminster Public School Board No. 257  
North Battleford Collegiate Institute Board No. 12  
North Battleford Public School Board No. 1438  
Prince Albert Public School Board No. 3  
Regina Board of Education  
Saskatoon Collegiate Institute Board No. 7  
Saskatoon Public School Board No. 13  
Swift Current Collegiate Institute Board No. 7  
Swift Current Public School Board No. 167

School Unit Authorities

Oxbow School Unit No. 1  
Estevan School Unit No. 2  
Willow Bunch School Unit No. 4  
Assiniboia School Unit No. 5  
Gravelbourg School Unit No. 6  
Shaunavon School Unit No. 7  
Eastend School Unit No. 8  
Arcola School Unit No. 10  
Weyburn School Unit No. 11  
Milestone School Unit No. 12  
Swift Current School Unit No. 15  
Gull Lake School Unit No. 16  
Regina (East) School Unit No. 20





Moose Jaw School Unit No. 22  
Herbert School Unit No. 23  
Leader School Unit No. 24  
Melville (North) School Unit No. 26  
Cupar School Unit No. 28  
Watrous School Unit No. 30  
Davidson School Unit No. 31  
Outlook School Unit No. 32  
Eston-Elrose School Unit No. 33  
Kindersley School Unit No. 34  
Kamsack School Unit No. 35  
Yorkton School Unit No. 36  
Lanigan School Unit No. 40  
Saskatoon (East) School Unit No. 41  
Rosetown School Unit No. 43  
Kerrobert School Unit No. 44  
Sturgis School Unit No. 45  
Wadena School Unit No. 46  
Wakaw School Unit No. 48  
Biggar School Unit No. 50  
Hudson Bay School Unit No. 52  
Melfort School Unit No. 54  
Kinistino School Unit No. 55  
Blaine Lake School Unit No. 57  
North Battleford School Unit No. 58



Wilkie School Unit No. 59

Lloydminster School Unit No. 60

Medstead School Unit No. 64

Turtleford School Unit No. 65

Meadow Lake School Unit No. 66



## APPENDIX B

### DATA FOR ADMINISTRATION SUBINDEX



## PRICE DATA FOR ADVERTISING COMPONENT

The following price data for advertising rates were furnished by the Saskatoon Star-Phoenix on January 29, 1969. These data were not received in formal letter form.

1957 Semi-Display	\$2.24 per inch
1963 Semi-Display	\$2.66 per inch





TABLE XLIX

SALARY DATA FOR THE LABOUR COMPONENTS  
OF THE ADMINISTRATION SUBINDEX

Year	Senior Clerk (1)	Price Relative (2)	Junior Stenographer			Price Relative (6)
			Regina (3)	Saskatoon (4)	Average (5)	
1957	\$ 86.04	100.00	\$45.12	\$41.40	\$43.26	100.00
1958	88.28	102.60	45.80	42.60	44.20	102.17
1959	88.90	103.32	48.56	48.41	48.49	112.08
1960	94.60	109.94	52.16	49.14	50.65	117.08
1961	108.70	126.33	53.37	53.91	53.14	122.83
1962	116.84	135.79	56.52	51.61	54.07	124.98
1963	118.92	138.21	57.89	52.56	55.23	127.66
1964	120.00	139.47	60.00	55.00	57.50	132.91
1965	122.00	141.79	60.00	58.00	59.00	136.38

Source: Government of Canada, Department of Labour, Wage Rates and Salaries, 1957-1965.



TABLE L

## PRICE DATA FOR VARIOUS COMPONENTS OF THE ADMINISTRATION SUBINDEX

Year	Duplicating Paper <sup>1</sup>		Advertising <sup>2</sup>		Other <sup>3</sup>
	Price (1)	Relative Price (2)	Price (3)	Relative Price (4)	Expenditures (5)
1957	\$2.95	100.00	\$2.24	100.00	100.00
1958	2.95	100.00	2.24	100.00	104.00
1959	3.95	133.89	2.24	100.00	107.40
1960	4.05	137.28	2.24	100.00	112.00
1961	4.05	137.28	2.24	100.00	116.70
1962	4.05	137.28	2.24	100.00	120.50
1963	4.05	137.28	2.66	118.75	125.10
1964	4.05	137.28	2.66	118.75	129.40
1965	4.05	137.28	2.66	118.75	134.40

<sup>1</sup>See Appendix C<sup>2</sup>See Appendix B<sup>3</sup>Implicit Price Index for current government expenditures for goods and services, base shifted to 1957.



APPENDIX C

DATA FOR INSTRUCTIONAL SUPPLIES AND  
EQUIPMENT SUBINDEX



TABLE LI

PRICE RELATIVE DETERMINATION FOR THE BOOK COMPONENT  
OF THE INSTRUCTIONAL SUPPLIES AND EQUIPMENT SUBINDEX

TITLE	Price									
	1957	1958	1959	1960	1961	1962	1963	1964	1965	
Happy Times	2.05	2.05	2.05	2.00	2.30,	2.30	2.40	2.40	2.35	
Cowboy Sam and the Indians	2.05	2.15	1.95	2.35	2.35	2.55	2.75	2.75	3.10	
The Brave and the Free	3.15	3.40	3.65	3.60	3.60	4.00	4.20	4.20	4.20	
Sails Set for Treasure Island	3.90	3.15	3.25	3.35	3.45	3.55	3.70	3.55	3.55	
Tom Sawyer	1.85	1.85	1.85	1.95	2.05	2.20	2.20	2.20	2.20	
Mr. Friend Flicka	3.00	2.10	2.10	2.10	2.20	2.20	2.30	2.80	2.70	
Good-bye Mr. Chips	1.05	2.90	2.90	2.90	2.90	2.95	2.95	2.90	2.90	
Sherlock Holmes	1.65	1.75	1.75	1.90	2.00	2.00	2.25	2.25	2.70	
Dent's Atlas	1.55	1.55	1.55	1.55	1.55	1.55	1.65	1.65	1.70	
Webster's Diction- ary	5.40	5.40	5.40	5.40	5.30	5.75	6.05	6.05	6.05	
Totals	25.65	26.30	26.45	27.10	27.70	29.05	30.45	30.75	31.45	
Average Price	2.56	2.63	2.65	2.71	2.77	2.91	3.05	3.08	3.15	
Price Relatives	100.00	102.73	103.51	105.85	108.20	113.67	119.14	120.31	123.04	

Source: Saskatchewan Book Bureau, Price Lists, 1957-1965





TABLE LII

DETAILS OF PRICE RELATIVE DETERMINATION FOR SCHOOL SUPPLIES  
COMPONENT OF INSTRUCTIONAL SUPPLIES SUBINDEX

	1957	1958	1959	1960	1961	1962	1963	1964	1965
<u>Furniture (Wt. .20)</u>									
Teachers' Desks	100.0	100.0	100.0	100.0	104.9	112.2	112.2	112.2	112.2
Students' Desks	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.8	84.8
Average	100.0	100.0	100.0	100.0	102.5	106.1	106.1	98.5	98.5
Wtd. Pr.Relative	20.0	20.0	20.0	20.0	20.5	21.2	21.2	19.7	19.7
<u>Chalkboard (Wt..14)</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Wtd. Pr.Relative	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
<u>Maps and Globes (Wt. .04)</u>									
Maps	100.0	100.0	100.0	100.0	100.0	100.0	100.0	102.5	102.5
Globes	100.0	100.0	100.0	100.0	100.0	100.0	108.5	108.5	112.8
Average	100.0	100.0	100.0	100.0	100.0	100.0	104.3	105.5	107.6
Wtd. Pr.Relatives	4.0	4.0	4.0	4.0	4.0	4.0	4.2	4.2	4.3
<u>Machines (Wt. .05)</u>									
Duplicators	100.0	102.0	102.0	102.0	102.0	102.0	110.0	110.0	110.0
Projectors	100.0	100.0	100.0	100.0	100.6	100.6	100.6	110.0	110.0
Average	100.0	101.0	101.0	101.0	101.3	101.3	105.3	110.0	110.0
Wtd. Pr.Relative	5.7	5.1	5.1	5.1	5.1	5.1	5.3	5.5	5.5
<u>Supplies (Wt. .57)</u>									
Paper	100.0	100.0	133.9	137.3	137.3	137.3	137.3	137.3	137.3
Charts	100.0	100.0	100.0	100.0	100.0	100.0	100.0	120.0	120.0
Average	100.0	100.0	116.9	118.6	118.6	118.6	118.6	128.6	128.6
Wtd. Pr.Relative	57.0	57.0	66.6	67.6	67.6	67.6	67.6	73.3	73.3
Sum of Wtd. Pr.Rel.	100.0	100.1	109.7	110.7	111.2	111.9	112.3	116.7	116.8

Source: Appendix C



**MOYER**

VILAS INDUSTRIES LIMITED 1935 FIRST AVENUE NORTH, SASKATOON, SASKATCHEWAN - 244-2108

SERVING EDUCATION &amp; INDUSTRY SINCE 1884

February 13, 1969

Mr. Harry E. Miller  
Dept. of Education Admin.  
Faculty of Education  
University of Alberta  
Edmonton, Alberta

Dear Sir:

We are returning the copy of letter from Mr. Dean and the information contained therein would also apply to Saskatchewan as our prices are the same for the two provinces. The only variation would be in item two, Proportion of Purchases and we have shown amended percentages that apply to the province of Saskatchewan.



## DATA FOR INSTRUCTIONAL SUPPLIES COMPONENT SUBINDEX

Moyer Division  
 Vilas Industries Limited  
 10924 - 119 Street,  
 Edmonton, Alberta,  
 December 13, 1967.

Mr. Peter Atherton,  
 Department of Educational Administration,  
 University of Alberta,  
 Edmonton, Alberta.

Dear Mr. Atherton:

We will endeavour to answer your questions in the same order as presented:

1. Category Breakdown - (1) Furniture  
 (2) Chalkboard  
 (3) Maps and Globes  
 (4) Machines  
 (5) General Supplies
2. Proportion of Purchases in Each Category -  
 (1) Furniture - ~~10%~~ 20%  
 (2) Chalkboard - ~~9%~~ 14%  
 (3) Maps & Globes - 4%  
 (4) Machines - ~~7%~~ 5%  
 (5) General Supplies - ~~62%~~ 57%
3. Representative Commodities -  
 (1) Furniture - (a) Teacher's Desks #22  
 (b) Students Desks #13-110  
 (2) Chalkboard- (a) Chalkboard  
 (b) Corkboard  
 (3) Maps & Globes - (a) Maps  
 (b) Globes  
 (4) Machines - (a) Duplicators  
 (b) Projectors  
 (5) General Supplies - (a) Duplicating Paper  
 (b) Place Value Charts #755
4. Commodity Price - 1957 - 1966 -

Continued





Mr. Atherton, December 13, 1967

Year	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Furniture										
a) Teach. Dk.	81.00	81.00	81.00	81.00	85.00	91.00	91.00	91.00	91.00	104.5
b) Stud. Dk.	28.00	28.00	28.00	28.00	28.00	28.00	28.00	23.75		
Chalkboard										
a) Hylo. sf.	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
b) Cork. sf.	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60
Maps & Globes										
a) LSR Maps	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.25	20.25	20.25
b) Chlg. Glb.	11.75	11.75	11.75	11.75	11.75	11.75	12.75	12.75	13.25	13.25
Machines										
a) Duplicat.	250.00	255.00	255.00	255.00	255.00	255.00	275.00	275.00	275.00	275.00
b) Project.	89.95	89.95	89.95	89.95	90.50	90.50	90.50	99.00	99.00	107.00
Gen. Supp.										
a) Dup. Paper	2.95	2.95	3.95	4.05	4.05	4.05	4.05	4.05	4.05	4.05
8 1/2 x 11, 18#										
b) Place Value chart	4.50	4.50	4.50	4.50	4.50	4.50	4.50	5.40	5.40	5.40

5. With slight fluctuations, I would consider these prices representative of school authority purchases,

Yours very truly,

M. F. Dean  
Manager

/w





## APPENDIX D

### DATA FOR PLANT OPERATION AND MAINTENANCE SUBINDEX



TABLE LIII

DETAILS OF PRICE RELATIVE DETERMINATION FOR VARIOUS  
COMPONENTS OF PLANT OPERATION AND MAINTENANCE SUBINDEX

Year	Janitors' Salaries <sup>1</sup>		Janitors' Supplies <sup>2</sup>		Other Expenditures <sup>3</sup>	
	Average Hourly Wage (1)	Price Relative (2)	Price Relative (1956=100) (3)	Price Relative (1957=100) (4)	Price Relative (1935-9=100) (5)	Price Relative (1957=100) (6)
1957	1.33	100.00	104.2	100.00	237.9	100.00
1958	1.38	103.75	107.1	102.78	238.3	100.16
1959	1.43	107.51	111.4	106.90	241.6	101.55
1960	1.43	107.51	113.4	108.82	242.2	101.80
1961	1.49	112.03	113.7	109.11	244.5	102.77
1962	1.57	118.04	113.6	109.02	249.0	104.66
1963	1.60	120.30	113.9	109.30	254.2	106.85
1964	1.68	126.31	114.9	110.26	256.4	107.77
1965	1.73	130.07	117.5	112.76	261.3	109.83

<sup>1</sup>Government of Canada, Department of Labour, Wage Rates and Salaries, 1957-65

<sup>2,3</sup>Dominion Bureau of Statistics, Prices and Price Indexes, 1957-65



TABLE LIV

DETAILS OF CONSTRUCTION OF A PRICE RELATIVE FOR UTILITIES  
COMPONENT OF PLANT OPERATION AND MAINTENANCE SUBINDEX

Weight	Electricity <sup>1</sup>			Fuel <sup>2</sup>			Water <sup>3</sup>			Component Subindex Values
	.4262			.4644			.1094			
	P.R. (1949)	P.R. (1957)	Wtd. P.R.	P.R. (1949)	P.R. (1957)	Wtd. P.R.	Rate	P.R.	Wtd. P.R.	
Year										
1957	115.2	100.00	42.62	104.2	100.00	46.44	.11	100.00	10.94	100.00
1958	115.7	100.43	42.80	107.1	102.78	47.73	.13	118.18	12.93	103.46
1959	116.8	101.38	43.21	111.4	106.90	49.64	.13	118.18	12.93	105.78
1960	117.2	101.73	43.36	113.4	108.82	50.54	.14	127.27	13.92	107.82
1961	117.6	102.08	43.50	113.7	109.11	50.67	.14	127.27	13.92	108.09
1962	116.5	101.12	43.10	113.6	109.02	50.63	.14	127.27	13.92	107.65
1963	116.8	101.38	43.21	113.9	109.30	50.76	.14	127.27	13.92	107.89
1964	116.2	100.86	42.99	114.9	110.26	51.20	.14	127.27	13.92	108.11
1965	114.3	99.21	42.28	117.5	112.76	52.37	.14	127.27	13.92	108.57

<sup>1,2</sup> Dominion Bureau of Statistics, Prices and Price Indexes, 1957-65

<sup>3</sup> Appendix D



TABLE LV

DETAILS OF CONSTRUCTION OF REPAIRS COMPONENT OF  
THE PLANT OPERATION AND MAINTENANCE SUBINDEX

Year	Material (weight .33)		Average <sup>2</sup>		Labour (weight .67)		Price Relative (1949=100) (1957=100) (1)
	Price Relative (1949=100)	Wtd. P.R.	Wage	Price Relative	Wtd. P.R.	Price Relative	
	(1)	(2)	(4)	(5)	(6)	(7)	
1957	130.0	100.00	\$2.01	100.00	67.00	100.00	
1958	129.8	99.84	2.08	103.48	69.33	102.28	
1959	131.7	101.30	2.15	106.96	71.66	105.09	
1960	132.3	101.76	2.20	109.45	73.33	106.91	
1961	131.1	100.84	2.21	109.95	73.67	106.96	
1962	131.9	101.46	2.26	112.43	75.33	108.81	
1963	135.1	103.92	2.33	115.92	77.67	111.96	
1964	139.6	107.38	2.38	118.40	79.33	114.77	
1965	146.8	112.92	2.56	127.36	85.33	122.59	

<sup>1</sup>Dominion Bureau of Statistics, Prices and Price Indexes, 1957-65

<sup>2</sup>Department of Labour, Wage Rates and Salaries, 1957-65





DOMINION BUREAU OF STATISTICS



Ottawa, Canada

190  
BUREAU FÉDÉRAL DE LA STATISTIQUE

April 23, 1969.

Mr. Harry E. Miller,  
Dept. of Education Administration,  
University of Alberta,  
Edmonton, Alta.

Dear Mr. Miller:

This will acknowledge your letter dated April 16, 1969.

I am pleased to enclose a table which presents the annual average movement of the Personal Property Insurance Index (1957=100) from 1957 to 1968.

If I can be of any further assistance to you, please feel free to write again.



Canada C.P.I.Personal Property Insurance Index (1957=100)

<u>Year</u>	<u>Index</u>
1957	100.0
1958	102.9
1959	108.0
1960	114.7
1961	116.4
1962	117.9
1963	121.2
1964	128.5
1965	136.1
1966	145.8
1967	154.3
1968	165.9



**THE CITY OF SASKATOON**

SASKATCHEWAN

COMMERCIAL OFFICE  
LIGHT & WATER DEPT.  
CITY HALLJ. W. BRECKNELL  
COMMERCIAL MANAGER  
TELEPHONE  
244-1620

February 4th, 1969

Mr. Harry E. Miller  
Dept. of Education Administration  
Faculty of Education  
University of Alberta  
EDMONTON, Alta.

Dear Sir:

Re: Rate Data Saskatoon Schools

As requested in your letter of January 27th, 1969  
we attach a schedule of rates which have been charged to  
Saskatoon schools since 1957.



PRICE DATA FOR WATER RATES

<u>1957</u>	1,000 cu.ft.	@ 30¢ per 100
	2,000 cu.ft.	@ 25¢ per 100
	10,000 cu.ft.	@ 20¢ per 100
	62,000 cu.ft.	@ 15¢ per 100
	325,000 cu.ft.	@ 11¢ per 100
	Over	@ 10¢ per 100
<u>1958</u>	100 cu.ft.	@ 36¢ per 100
	2,000 cu.ft.	@ 30¢ per 100
	10,000 cu.ft.	@ 25¢ per 100
	62,000 cu.ft.	@ 18¢ per 100
	325,000 cu.ft.	@ 13¢ per 100
	Over	@ 12¢ per 100
<u>1960</u>	1,000 cu.ft.	@ 3.9¢ per 100
	2,000 cu.ft.	@ 32¢ per 100
	10,000 cu.ft.	@ 26¢ per 100
	62,000 cu.ft.	@ 19¢ per 100
	325,000 cu.ft.	@ 14¢ per 100
	Over	@ 12.75¢ per 100
<u>1967</u>	1,000 cu.ft.	@ 48¢ per 100
	2,000 cu.ft.	@ 37¢ per 100
	10,000 cu.ft.	@ 30¢ per 100
	62,000 cu.ft.	@ 21¢ per 100
	325,000 cu.ft.	@ 16.5¢ per 100
	Over	@ 14.75¢ per 100





## APPENDIX E

### DATA FOR CONVEYANCE SUBINDEX



TABLE LVI  
DETAILS OF CONSTRUCTION OF THE REPAIRS COMPONENT SUBINDEX FOR CONVEYANCE

Year	1957	1958	1959	1960	1961	1962	1963	1964	1965
	Price Relatives								
Lubrication	100.0	100.0	100.0	105.6	108.3	113.9	117.4	117.4	117.3
Fender Replacement	100.0	106.8	110.2	116.4	117.6	122.1	129.8	133.6	140.4
Brake Lining	100.0	101.5	104.6	106.6	106.8	109.6	110.7	109.7	108.9
Muffler Relacement	100.0	104.2	107.4	111.5	112.8	111.0	99.5	91.7	94.3
Battery 10	100.0	93.7	94.6	92.5	93.1	95.5	90.5	90.2	93.9
Total	500.0	506.2	516.8	532.6	538.6	552.1	547.9	543.1	554.8
Average Price Relative	100.0	101.24	103.36	106.52	107.72	110.42	109.58	108.62	109.6

Source: Appendix E



TABLE LVII

DETAILS OF PRICE RELATIVE DETERMINATION  
FOR THE MECHANICS' SALARIES COMPONENT  
OF THE CONVEYANCE SUBINDEX

Year	Hourly Wage				Price Relative
	Moose Jaw	Regina	Sask- atoon	Total	
1957	1.51	1.89	1.83	5.23	100.00
1958	1.70	1.89	2.05	5.64	108.05
1959	1.80	2.12	2.13	6.05	116.09
1960	1.85	2.17	2.14	6.16	117.82
1961	1.85	2.17	2.14	6.16	117.82
1962	1.93	2.27	2.25	6.45	123.56
1963	1.97	2.35	2.37	6.69	128.16
1964	2.02	2.43	2.38	6.83	131.03
1965	2.10	2.50	2.51	7.11	136.21

Source: Department of Labour, Wage Rates and Salaries,  
1957-65



DOMINION BUREAU OF STATISTICS



Ottawa, Canada

197  
BUREAU FÉDÉRAL DE LA STATISTIQUE

February 19, 1969.

Mr. Harry E. Miller,  
Dept. of Education Administration,  
University of Alberta,  
Edmonton, Alta.

Dear Mr. Miller:

As requested in your letter dated February 12, 1969, I am enclosing two tables which present the annual average price relatives from 1957 to 1965, for the various components of the Automobile Operation Index for the cities of Regina and Saskatoon.

If I can be of any further assistance to you, please feel free to write again.





# Automobile Operation Index and Components

Regina - 1957=100

	Weight	1957	1958	1959	1960	1961	1962	1963	1964	1965
Automobile Operation	100.0	100.0	104.7	105.8	104.8	100.8	101.5	101.8	100.7	101.4
Auto Purchase	52.08	100.0	106.3	107.2	106.6	101.8	101.0	101.5	99.6	97.8
Gasoline	24.19	100.0	101.2	100.5	99.8	95.8	99.2	100.6	99.8	98.9
Motor Oil (1)							99.2	103.1	112.3	115.3
Tires	3.08	100.0	99.9	102.4	106.8	110.8	111.3	113.0	116.0	121.3
License	2.74	100.0	100.0	100.0	100.0	100.0	100.0	100.6	101.6	107.5
Insurance	7.95	100.0	109.7	115.6	105.6	95.9	93.5	88.7	86.3	100.7
Lubrication	2.30	100.0	100.0	100.0	100.0	100.0	111.1	116.6	116.6	115.3
Fender Replacement	2.29	100.0	107.1	110.0	115.0	116.5	121.3	130.8	135.5	143.4
Brake Relining	2.29	100.0	103.3	107.3	108.6	108.5	112.9	112.8	113.6	116.6
Muffler Replacement	2.29	100.0	105.2	108.6	111.8	113.5	112.3	99.3	89.1	92.6
Battery	.79	100.0	99.8	99.3	96.2	95.1	99.3	95.8	93.3	96.8

(1) Motor oil added in Sept. 1962

Weighted at 1.94 - Gasoline weight reduced to 22.25



# Automobile Operation Index and Components

Saskatoon - 1957=100

	Weight	1957	1958	1959	1960	1961	1962	1963	1964	1965
Automobile Operation	100.0	100.0	105.2	108.0	106.5	102.1	102.5	101.0	99.7	99.0
Auto Purchase	52.08	100.0	108.0	112.0	109.6	102.4	103.7	102.3	100.3	98.4
Gasoline	24.19	100.0	100.6	100.3	99.8	99.1	98.6	96.9	96.1	95.2
Motor Oil (1)							98.7	100.8	105.7	107.2
Tires	3.08	100.0	99.7	101.5	105.0	109.3	106.5	108.0	109.6	114.6
License	2.74	100.0	100.0	100.0	100.0	100.0	100.0	100.6	101.6	107.5
Insurance	7.95	100.0	109.7	115.6	105.6	95.9	93.5	88.7	86.3	86.3
Lubrication	2.30	100.0	100.0	100.0	111.1	116.6	116.6	118.2	119.3	119.3
Fender Replacement	2.29	100.0	106.4	110.4	117.8	118.6	122.8	128.8	131.7	137.4
Brake Relining	2.29	100.0	99.7	101.9	104.6	105.1	106.7	108.5	105.8	101.1
Muffler Replacement	2.29	100.0	103.1	106.1	111.2	112.0	109.7	99.6	94.2	95.9
Battery	.79	100.0	97.6	89.5	88.8	91.1	91.7	85.2	87.1	91.0

(1) Motor Oil added in Sept. 1962  
Weighted at 1.94 - Gasoline weight reduced to 22.25



# Lloydminster School Unit No. 60 of Saskatchewan

Lloydminster, Sask.

P. A. Okerstrom, Sec.-Treas.

January 31, 1969.

Mr. H.E. Miller,  
527 Michener Park,  
Edmonton, Alberta.

Dear Sir:

In reply to your enquiry re Expenditures of this Unit for various items, we are pleased to provide the following information:

1. "Fees" under conveyance refers to tuition fees paid to schools outside the Unit at which students from the Unit area attend. These fees are paid entirely to the Lloydminster City Public and Separate Schools. Students in the Unit surrounding Lloydminster are transported into the city by bus and fees are paid to the City Boards for tuition.
2. High School Allowances have been almost eliminated with the development of a complete bus service. Before bus routes were established, an allowance was made to students to assist them with transportation costs or to assist with boarding costs if it was necessary that they live away from home in order to obtain an education not being provided in their own area. If bus service is being provided, no allowance is paid. A total of \$2083.50 was paid out in 1968 for this.
3. High School fees are the same as in item No. 1. No breakdown is made to separate fees of elementary or high school students.

4. Conveyance Costs:

Cost of Conveyance in 1968: \$231,193.37	
Bus Drivers' Wages	\$107,191.00
Mechanics' Wages	19,213.36
Gas & Oil	50,038.75
Repairs	37,756.35
Tires	7,689.04
License & Insurance	7,735.56
Service Truck	360.89
Garage Expense; Heat,	
Light, etc.	1,208.42





Mr. H.E. Miller

- 2 -

January 31, 1969

From the above you can work out the required percentages. This covered the costs of 51 regular bus routes plus 4 spare buses.

5. Plant Operations: (1968)

Caretakers' Wages	\$34,820.70
Janitorial Supplies	2,848.70
Workmen's Compensation	156.44
Fuel	18,849.87
Light	12,240.45
Water	3,314.54
Sanitation Services	474.00
Telephones	1,150.08
Repairs	28,939.73
Taxes	7,611.39
Insurance	<u>4,574.70</u>
Total -	114,980.60

From these figures you will also be able to arrive at the desired percentages.

I trust this information is sufficient for your purposes. Our auditor's statement for 1968 will be available for distribution on or about February 28th, and if you should wish to have a copy, please write us again.

Yours truly,





The following data, not in formal letter form, were received on January 31, 1969 from Mr. M. Pickering, Unit Manager, Assiniboia School Unit.

In 1968, 55 bus routes were in operation with 60 buses (5 spares), 30 bombadiers (used for emergencies), one 1/2-ton truck, and one 2-ton winch truck. 1968 expenditures on conveyance were:

Drivers' wages	\$94,366.66
Mechanic	15,338.97
Gas and Oil	51,637.41
Repairs	57,997.49
Tires	7,027.30
Insurance	2,360.82
License	5,722.00











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